NOV 15 1944

The Journal of the *International College of Surgeons*

Medical Library

Medical Library

COLLEGE INTERNATIONAL DE CHIRURGIENS

Vol. VII *September-October, 1944* No. 5

Official Journal of The International College of Surgeons Published Bimonthly

Spinal anesthesia limits the blackout of pain to the area where it is needed.

NEOcaine has won a prominent place among spinal anesthetics, both because of its inherent qualities and its extensive use in manifold surgical procedures. The many advantages of NEOcaine enhance the skill of the surgeon:

- ★Perfect anesthesia with complete muscular relaxation.
- ★Minimal crowding of abdominal viscera due to decongestive effects and flattening of intestines.
- ★Scarcely any reactions such as nausea and vomiting or gaseous distention.
- ★Lung or kidney complications nonexistent.
- ★Quick recovery. Convalescence shortened because normal diet need not be altered.
- ★Sutures left undisturbed.

The use of NEOcaine for spinal anesthesia *simplifies* abdominal surgery, by facilitating conditions most favorable for sterile surgery. With it operative and postoperative risks are reduced to a minimum.

Boxes of 10 ampoules of 50, 80, 100, 120, 150, 200 and 300 mg. of pure procaine hydrochloride.

NEOcaine

FOR SPINAL ANESTHESIA

ANGLO-FRENCH LABORATORIES INC.
75 VARICK STREET NEW YORK, N. Y.

M

pea
adv
Hit
sup
wha
tion
wha
ing

Y
the
ingl
ans
that
thos
or
com

I
ger
late
who
row
trai
war
cap
and
pur
ove
live

A
Wa
nat
the
to s
of

* I
of t
New

Rehabilitation, or the Salvaging of Manpower*

FRED H. ALBEE, M.D., F.A.C.S., F.I.C.S.
NEW YORK, NEW YORK

MANPOWER today is the crying need of all Nations—first to win the war, and then to win the peace. And when I say "crying" I speak advisedly. We all know what devices Hitler is using to augment his dwindling supply of manpower. We all know, too, what a manpower shortage our own national wartime needs are disclosing, and what a high rate of rejectees we are finding among our youth.

Yet for all of us, despite the degree or the cause of our need, there is increasingly, as the war goes on, one common answer to our manpower problem, and that answer is *rehabilitation* of rejectees, those physically handicapped by injury or disease, or both, in training and in combat.

In all our countries, there is a staggering total of unused manpower hours latent in the physically unfit of today, who can be made physically fit for tomorrow; in those thousands of highly trained, highly skilled men, victims of war and of circumstances, who, once incapacitated, can be salvaged and put *back and back* into war and vital industrial pursuits, and finally, when the war is over, into self-supporting readjusted lives.

All signs point to the fact that World War II will be finally won, not by the nations or groups of nations possessing the most planes, ships, tanks and guns to start with, but by the nation or group of nations which expends and salvages its manpower in the most intelligent fashion—both to make these planes, ships, tanks and guns, and then to man them in successful action.

Certain types of manpower are always more expendable than others. The youth who fulfills his greatest wartime destiny in the peeling of potatoes is not as vital a candidate for salvage—from the point of view of national salvation—as the youth who, as one of the cream of the national health crop, was chosen to be trained as a Flying Fortress pilot, at a national expense of approximately $75,000, and who, despite a foot cut off by a Jap propeller, while he floated down in his parachute, still possesses the vital requisites for doing his job well—perfect hearing and sight, and heart, lungs and physical stamina adequate to prevent "blacking out" during sharp turns at great speed, in addition to expert skill gained during his months and months of training.

One of the sad truisms of war, unlike the situation in industrial accidents, is that the ablest men are the ones who most often get hurt. The leaders of men, those with daring, courage and all the desirable qualities of fighters, are most frequently on the casualty lists. Their followers and the others have a much lower incidence of injury.

And, naturally, for the sake of future eugenics, if not for the needs of immediate survival, the leaders of our nation must be salvaged to their fullest possible extent, and as often as such salvage can react to their own or the Nation's good.

* Presented at the Fourth International Assembly of the International College of Surgeons, held in New York, June, 1943.

Of course, in a sense, we surgeons are rehabilitating every day of our lives. Whenever we operate or give any kind of a treatment, we are performing a kind of human salvage but, I wish to emphasize, not completing it. And this has always been true since the very beginning of surgery. Formal and complete rehabilitation, in the international meaning and acceptance of the word as it is used today, dates from World War I when the number of the injured focused the attention of the world on the need for such rehabilitation—and the progress in surgery itself provided the first step toward making such human salvage possible.

All this was discussed at the Interallied Congress on Rehabilitation which met at Rome, Italy, in the summer of 1919 *after* the Armistice, and from which we all returned to our respective countries, as I am sure we will go out from this Congress, wiser and better equipped for our work in human salvage.

As a representative of the Armed Forces of this country, I returned from this Congress to the State of New Jersey, where already the groundwork for the amazing record in rehabilitation it has since achieved had been well laid, both by the work at the United States General Hospital No. 3 at Colonia, New Jersey, and by the passage of the first of all the civilian rehabilitation laws in this country on April 10, 1919, the New Jersey Rehabilitation Law. This law, which was largely premised on our accomplishments at the United States General Hospital No. 3, authorized the New Jersey Rehabilitation Commission to *physically* and/or vocationally rehabilitate the State's adult crippled citizens to the end that they might attain self-support, and by so doing laid the foundations for the newest development in rehabilitation, the salvage of the rejected Selective Service draftee. It is remarkable to state that while this Assembly of the International College of Surgeons has been going on, with a symposium on Rehabilitation, the Congress at Washington has passed a generous epoch-making law to furnish rehabilitation in conjunction with the states to the rejectees, the returned wounded soldier or to the physically handicapped civilians.

At the United States General Hospital No. 3, where as Chief Surgeon I was in charge of the rehabilitation of thousands of wounded veterans from the last War, I had the opportunity of both seeing—and often initiating—the actual working of rehabilitation in its many phases.

United States General Hospital No. 3 was for much of its existence classified as one of the two amputation centers of the Army and the methods we instituted there illustrate very well a complete rehabilitation program as a special type of case. Even prior to its official classification as an amputation center, General Hospital No. 3 had been receiving a generous allotment of amputation cases. Most of these patients arrived with open stump wounds, badly infected, which after being sterilized by the Carrel-Dakin wound treatment method, required reamputation or plastic operations on the stump. In many instances, patients were received with the stump healed and large scars present with protruding bone, in which cases excision of the scar with bone and plastic closures were necessary.

The whole process of rehabilitation was especially well illustrated by this class of case. The morale of these "buddies" needed first attention in many cases, and, therefore, every effort to engage their interest and stimulate their courage was desirable, even before they were out of bed. Following physiotherapy treatment to mobilize their stumps, and particularly the nearest joint to the stump, or to overcome any contracture, vocational therapy was given while in bed and afterwards. It was found to be

far and away the most effective morale and physical builder. Vocational therapy merged later into vocational education in the extensive artificial limb manufacture which was one of the important units of the hospital. The men were taught everything about the manufacture of their own artificial limbs, the fitting and use, as well as walking exercises in the gymnasium and dancing.

It was surprising how well amputees danced with attractive dancing partners. The examples of these boys (to all types of cases) showing what they could do after the loss of their legs even above the knees had a most beneficial effect upon the morale of the whole hospital. Two amputees of unusual ability and mental poise whom I was able to have inducted into the Army from civil life, were also of great aid in building morale; one who had lost both arms above the elbows would hold his cue between his upper arm stumps and beat any boy in the camp at billiards. The other fellow had lost one arm above the elbow, and the other below the elbow; nevertheless, he had invented artificial hands activated by straps over the shoulders with which he could do almost anything, even to threading needles.

The special training thus acquired might lead directly to a gainful occupation, or it might be the first step to some other trade of more complicated character.

Of course there were many other types of injury which found their way to this hospital, as for instance, pathologic and traumatic conditions of the spine and cases of nerve injury, including many with loss of substance. But the majority of the cases involved injuries of the extremities, either previous amputations or injuries from shrapnel or high explosives. An exceptionally large number of cases of gun-shot wounds with extensive loss of bone which had been either shot away or removed at an earlier operation were, by general orders, sent to this hospital.

But, whatever the disability, the first step in the veteran's rehabilitation was the repair of his body, the putting of him in the best possible physical condition. This was viewed as much more than a mere surgical process—or a surgical follow-up treatment process. Almost as soon as the patient came out of the ether and his temperature was normal, some form of physiotherapy or occupational therapy was instituted. To an ex-mechanic this might mean the making of toys out of empty typewriter spools, a discarded shaving cream tube and the exercise of his ingenuity. To a youth with an artistic bent, this might mean the arousing of his interest in drawing or painting. If his war disability was of a nature to necessitate a change of occupation, even as early as this, his taste for drawing might be trained into the new career of draftsman by the simple expedient of fastening the drawing board to his bed at right angles to his body and permitting an ambulatory buddy who himself was an expert draftsman in civilian life to pass on his art and knowledge.

In cases where contractures had to be worked out, the handling of paint brushes, the shaping of pottery, the working of a telegraph instrument all served the double purpose of providing a new skill as well as an effective means of occupational therapy.

Once the patient was able to get up and about, he went to the Curative Workshop, where further phases of his occupational therapy or education were instituted, and not only was his work aptitude and capability judged, but he himself became reconciled to the limitations of his new physical condition—under circumstances of common misery as well as common sympathy, which were conducive to removing the sting from

each individual's own personal tragedy.

And, of course, in all this work the primary aim—aside from morale preservation—was the building of a bridge back to civilian life via a retrained old skill or a newly acquired skill—in many cases, a higher skill than that possessed by the veteran in his pre-war days.

All kinds of classroom learning were also given at United States General Hospital No. 3. In order to make some of the veterans employable, even the three "R's" had to be taught—as well as courses of college grade for those who elected to improve their enforced leisure with higher learning, and were equipped to profit from them. Many of the veterans who desperately needed a course in rudimentary English considered it much too "sissy" to be taken seriously until their instructor, who had also lost a leg in France, had the wisdom and "guts" to have his artificial leg fitted right in class. The way he stood the pain, which many sitting before him understood only too well, from their own experience, had very definite repercussions on their own futures. Out of the newly awakened admiration for their teacher, they really began to learn English.

In view of the great benefits to be derived from occupational therapy, one of the manpower shortages which rehabilitation *per se* cannot do much about, is the shortage of trained occupational therapists. It is sad to relate that today only three colleges in the country give courses in occupational therapy, and the demand, even before the conclusion of World War II, is so far in excess of the supply that it may become tragic.

The public at large is just waking up to the fact that rehabilitation is not something academic and remote, but something highly personal and practical which may touch either themselves or some one very close to them. When this awakening becomes sufficiently widespread to demand increased facilities and governmental organization for rehabilitation, the much-to-be-desired Siamese-twin relationship between rehabilitation and manpower will become a working reality. And until that day comes, it cannot.

Many are already familar with the work of the Rehabilitation Commission of New Jersey, which for the past twenty-five years, ever since its conception, has been rehabilitating civilians and veterans alike on the principle that physical rehabilitation should come first; educational rehabilitation, which in many instances is found unnecessary after the physical rehabilitation has been completed should come second. And, last of all, should come the best possible job the rehabilitant can hold.

From that long peacetime interlude of experience, we have learned many things —all of which are now being put at the disposal of the wounded of World War II, as well as the rejected draftees and the injured civilian. I say "we have learned," because I have had the privilege of being Chairman of the New Jersey Rehabilitation Commission ever since its first meeting. And high on the list of things learned is the fact that while every rehabilitation candidate is a case apart, a law unto himself, there are certain factors which militate for or against successful rehabilitation in all cases.

The first of these is the patient's own desire to coöperate. Without this, the best attempts at rehabilitation will fail. With coöperation, even seeming miracles are possible.

Coöperation, of course, is obviously the first requirement in the salvaging of the rejected draftee. There is no law in the land to make a man undergo treatment to put his body in shape to serve his country. There is only the tact and judgment of his reëxamining doctor—and this puts an added burden upon us. It

takes approximately nineteen years to produce a new man able to bear arms—but perhaps only the fraction of a minute to choose the right word to convince a physically unfit man that in a few weeks he could be doing both himself and his country a tremendous service by making himself eligible for combat duty.

A man who has been injured in battle, and is anticipating going back into service presents comparatively few problems to the rehabilitator. His morale is good because he has his sights set on getting back into action.

It is the badly wounded veteran or the civilian cripple who is sure he is finished in every sense of the word who becomes the real "problem child" in rehabilitation. A wounded veteran, for instance, is, aside from his wounds, usually an extremely healthy individual. He has all the desires for life which were his before he was wounded, but thanks to the intervention of a bomb or a bullet, he feels he is no longer equipped for life. He can see no future for himself anywhere.

I have in mind a recent case which was brought to my attention. This chap had lost both feet as the result of exposure during the North African campaign. Located in a hospital on Staten Island, with a mother and family in Brooklyn—he refused to let them know of his existence. He wanted them to think of him as dead. By inquiry through the Red Cross, this boy's mother finally located him and now he is well on the way to recovery.

That is a state of mind which is familiar to all workers in rehabilitation, and one which must be guarded against right from the very first. The fact that the war has brought a new feeling to replace the old prejudice against the hiring of the handicapped is one which deserves greater publicity. Many of the boys who are just back from fighting our front-line battles have not heard about it yet—or if they have, they yet don't know how to translate it into personal terms.

Above all else, we must make practically all of our new cripples of World War II realize that no matter what their disability, there is a place for them to fill. They must continue to feel that their life is still valuable to their country.

All cripples have the fear that their distorted bodies or limbs will offend others. By experience, we have found that this fear can be readily transformed, through occupational therapy, into the desire to make others forget their disabilities in the light of their achievements. The best way to start this cycle of achievement is to give the patient a first job project which is well within his power to carry to successful completion. Success breeds more success in occupational therapy as in other fields of life, and perhaps it is even more vital to the health and well-being of the individual. If a patient, already suffering from an acute sense of his own futility, were given an assignment beyond his mental and physical reach, instead of the glow of success stimulating him to further achievement, even the slightest kind of a trivial defeat, added to his previous complex, might be the straw to produce a permanent psychosis.

The Curative Workshop of the New Jersey Rehabilitation Commission, has proved our best insurance against this false step. Here men in the process of being rehabilitated are measured for their industrial harness by a step-by-step program. First they are assigned to the simplest kind of work selected in accordance with the rehabilitant's aptitude, the kind not only within their scope, but designed to further their physical betterment. Then as they master the easier technics, they are gradually upgraded to their fullest capacity, and all the while their various aptitudes, educational back-

ground, physically handicapped condition, etc., are being weighed and evaluated.

The time now has come for rehabilitation to step out and take the place it deserves in our public life and our public thinking. Nobody believes the winning of the war and the peace will be easy. But armed with the most effective weapons of rehabilitation we can devise, we know it will be easier.

By a curious coincidence, rehabilitation and much of our fighting manpower of today are in reality twins. They were both born in World War I. They both grew up in the peace era between wars. And they both now stand ready to serve in the hour of the Nation's need. But, they cannot serve most effectively unless they are merged, and it is up to us to bring about this merger.

SUMMARY

Rehabilitation of military rejectees is a crying need of all nations arising out of World War II. Surgery is a variety of human salvaging, but does not complete it, though progress in surgery makes more human salvaging possible. Experiences in an army amputation center and with the New Jersey Rehabilitation Commission are described. The Curative Workshop and classroom teaching were two important methods employed. The one certain fundamental requirement for successful rehabilitation is coöperation of the patient and his realization that society has a definite place for him.

SUMARIO

La rehabilitación de los militares rechazados constituye una urgente necesidad en todas la naciones, como consecuencias de la guerra actual (World War II).

La cirugía es un medio de salvamiento humano, y aún cuando insuficiente *per se*, el progreso en todos los ramos de la cirugía prometen más y más el salvamiento humano.

El autor describe las experiencias en un "Centro de Amputación" de las fuerzas militares y de la Comisión Rehabilitación de Nueva Jersey.

La Sala de Trabajos de Cura y la Sala de Enseñanza, son importantes métodos empleados.

Un requisito fundamental para la rehabilitación es la cooperación del paciente y su reconocimiento que en la vida social se le asegura un puesto de utilidad.

RÉSUMÉ

La réhabilitation de ceux rejetés par l'armée ou par la marine vu qu'ils sont impropres pour le service militaire est une question qui est à l'ordre du jour. La chirurgie contribue mais ne complète pas cette réhabilitation. Les résultats des études et des expériences personnelles du centre militaire du New Jersey Rehabilitation Commission pour les amputés sont rapportés en détail. Il importe d'obtenir la coopération du mutilé et de lui démontrer les heureux résultats qu'une intélligente persévérance peut obtenir, et surtout de le préparer à remplir un rôle utile dans la société.

Выводы

Реабилитация военных инвалидов повсюду является очень острой необходимостью, созданной Второй Всемирной Войной. Хирургия является одним из способов восстановления человеческаго матеріала, но только частичным, хотя прогрес хирургии расширяет поле человеческой реставрации. В этой статье описан опыт приобретенный в военном ампутационном центре в Ню Джерси Реабилитационной Комиссии (New Jersey Rehabilitation Commission). Двумя важными методами являются лечебная трудовая мастерская и школьное лечение. Основным принципом для успешной реабилитации является содействие пациента и его понимание, что общество имеет для него определенное место.

Crush Syndrome*

HAMILTON BAILEY, F.R.C.S. (ENG.), F.I.C.S.
LONDON, ENGLAND

THE term "crush syndrome" is not a particularly good one, but it is always difficult to alter nomenclature which has become popular. As Benison points out, often the patient remains comparatively well while trapped, the symptoms coming on after release; the "crush syndrome" would, therefore, be better named the "release syndrome." Because anuria is the leading feature, Bywaters and Dible suggest that the condition should be known as "traumatic anuria."

Few British surgeons had heard of the crush syndrome until 1941, for it had not been described in the English literature. According to E. G. L. Bywaters, by the end of the 1914-18 war the syndrome was well recognized by the Germans. Even before this era the condition was not unknown; nineteen cases had been recorded in connection with the Messina earthquake in 1909.

In order to make clear what is meant by this term, a description of a typical case history will be given.

As a result of bombing, masonry collapsed and the patient's thigh was pinned beneath débris (Fig. 1) for about two hours. He was extricated and taken to a hospital, where he was treated for shock with good effect. Radiography revealed no bony injury, but obvious extensive muscle damage and hematoma formation had occurred in the affected limb. About twenty-four hours later his urinary output became severely diminished. In spite of a high fluid intake, anuria followed.

Too often death from uremia results, usually about the seventh or eighth day. The problem before us is to institute effective treatment. In order to do so, the cause of the syndrome must be understood. At the present time it can hardly be said that the understanding of the underlying pathology has passed the stage of ingenious hypothesis.

Fig. 1. The type of accident which results in the crush syndrome.

ETIOLOGY

So akin is this phenomenon to anuria following incompatible blood transfusion that the idea of uriniferous tubules choked with disintegrated erythrocytes was appealing. Since many crushed patients had received blood or plasma transfusion, it was not unnatural that inquiring minds demanded that anuria from such a cause should be eliminated before a new explanation was sought. Fortunately, a few cases were reported

* Presented at the Fourth International Assembly of the International College of Surgeons, New York, June, 1943.

where transfusion had not been given; furthermore, cases also occurred before transfusion was in general use. It now seems established that the anuria and other toxic phenomena are due to poisonous products entering the circulation from crushed and dying tissues. Some theorists suggest that katabolites, *e.g.*, histamine, released from the mass of crushed muscle are the cause of the trouble; others that the pigment myohemoglobin derived from the same source is the noxious agent. Shaw Dunn claims to have demonstrated a specific renal tubular lesion (Fig. 2). He argues that phosphoric acid or uric acid are more likely to produce toxic changes than myohemoglobin.

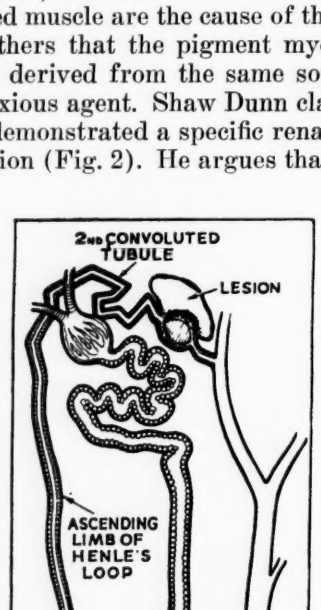


Fig. 2. The lesion in anuria due to crush syndrome (Shaw Dunn's findings). The ascending loop of Henle and the second convoluted tubules are alone affected.

From the practical standpoint, one piece of experimental work is of outstanding significance. Eggleton has shown that the failure of renal function following limb crushing in dogs can be minimized or abolished by readmitting circulation to the crushed limb gradually.

Patey and Robertson believe that the phenomenon is due entirely to an escape of blood constituents into the tissues of the limbs, the capillaries of which have temporarily lost their function through long compression. They believe that fluid given intravenously drains into the toneless member, the potential capacity of which is enormous.

Still other theories have been put forward. Many of these appear to be poorly supported by biochemical or pathologic findings. Before leaving this interesting, but unsatisfactory, inquiry we should take into consideration that sulphonamides, particularly sulphapyridine, predispose to hematuria and oliguria.

CLINICAL FEATURES

The patient remains comparatively well while trapped; the untoward symptoms come on usually in a matter of hours after release.

GENERAL CONDITION

Change in the mental outlook is often a premonitory sign. Cheerfulness gives place to apathy; composure to restlessness; unclouded cerebration to mild delirium. Fainting sometimes ushers in the syndrome. From the point of view of instituting rational treatment it is of paramount importance to make up one's mind whether the patient is suffering (in part) from shock, and, if so, what part shock or delayed shock is playing in production of symptoms. In this connection oft repeated blood pressure readings are of signal service. It should be noted that a number of observers state specifically that their patient was not suffering from shock or had recovered from shock. Slight cyanosis has been observed so

often that it can be taken that this sign of anoxemia is an integral part of the syndrome. Mild jaundice has been noted in several cases; its onset is reported as early as the second day and as late as the fourteenth day.

THE URINE

Most patients admitted as air raid casualties pass comparatively little urine during the first twenty-four to thirty-six hours. This is due to a variety of causes, such as shock, or dehydration following adrenal over-activity at the time of the ordeal. This, coupled with the fact that the nursing staff is usually overworked by the inrush of casualties, leaves little wonder that often oliguria, the cardinal premonitory sign of the crush syndrome, has been overlooked in the early stages. Like other forms of anuria, the longer the condition persists the more difficult it is to treat. The scanty urine excreted during the early stages of the crush syndrome is highly acid, and often contains blood pigments. Of course a catheter may be necessary in order to secure sufficient urine to make this observation.

THE LIMB

So impressive is established anuria that most observers reporting cases have failed to detail the physical signs they found in the limb. If Patey and Robertson's theory is correct, one would have expected the swelling of the limb to be so striking as to demand comment, yet this does not appear to be a general rule. In some cases the limb presents signs of impending gangrene; it is relatively cold and the nail beds are cyanotic. In other cases there is edema and blistering. Further observations on the girth of the limb, the presence of edema and the state of the pulse below the crush are needed.

FIRST AID

During the period of pinning, if conditions allow, fluids should be given by mouth (if necessary by a long rubber tube and funnel which should be part of the armamentarium of rescue parties). Any warm fluid is suitable, and alcohol must be avoided. If there is severe pain, morphia injections must not be withheld, but it is questionable if heavy doses of ½ to 1 gr. should be given. However remote the chances of extrication may seem, mental encouragement to the victim is essential. When respiration is restricted, every effort must be made to administer oxygen to the trapped patient (Shepherd). As soon as the limb has been freed, or before if possible, a tight bandage or tourniquet must be applied *above the part which was crushed.* This must be carried out as a first aid measure before the patient is moved.

TREATMENT

That some kind of tourniquet or an elastic web bandage should be applied before release, as suggested above, or as soon afterwards as practicable, in order to prevent a mass release of toxin into the circulation or loss of blood constituents into it, seems agreed upon. That the tourniquet be loosened gradually and intermittently is the essence of the fulfilment of all the hopeful theories built around this subject. Patey and Robertson employ a pneumatic tourniquet.

Cohen finds that the absence of arterial pulse due to arterial spasm or "stupor" is quite common when blood is extravasated in the neighborhood of an artery, and if at the end of six to twelve hours the distal pulse has not returned, he advises that at any rate the main vessels should be exposed under local anesthesia and cleared of surrounding blood clot. If time permits, periarterial sympathectomy can be performed with advantage. If necessary the wound can be left unsutured. These remarks concerning operative treatment apply to patients admitted

in good condition and where full preventive measures regarding renal protection have been inaugurated. This brings us to the all important management of the case.

As soon as the crushed patient has been thoroughly examined clinically, it will be possible to segregate the case into one of four categories:

A. *The patient is not severely shocked; indeed he appears comparatively well.*

This is the largest group and the one where preventive measures are preëminently important.

1. Place some form of tourniquet above the crushed area and arrange for this to be loosened intelligently over a period of several hours. This important task must not be relegated to a nurse or an orderly. The surgeon or his properly instructed deputy must, if necessary, be called every hour during the night.

2. Order in writing on the patient's case sheet that all urine must be saved and charted. At the end of twenty-four hours, the amount the patient has passed must be clearly recorded. Accurate charting must continue for at least fourteen days.

3. Order a high fluid intake—5 to 6 pints at least in the twenty-four hours. If necessary give this intravenously or intramuscularly, but usually it suffices to encourage the patient to drink.

4. Prescribe sodium citrate (not *potassium* citrate) 2½ grammes and sodium bicarbonate 2½ grammes to be given every three hours until the urine is alkaline to litmus, and continue with this prescription as necesary to keep the urine alkaline. The urine must be tested twice a day.

B. *Unquestionably the patient is suffering from oliguria.*

The call for alkalinization of the urine is urgent. There is no better method than to inject intravenously 10 cc. each of isotonic sodium lactate solution and a saturated solution of sodium bicarbonate.* If these drugs are not available, a 3.8 per cent solution of sodium citrate can be given intravenously. In contradistinction to cases belonging to Group A, fluid should be administered by the intravenous route; such administration should proceed cautiously at first.

C. *The patient is suffering from severe shock.*

The treatment of the shock must receive priority. The extent of the renal damage being unknown, it would be foolhardy to proceed in the usual manner of treating shock by modern methods. Even in cases of the shock-hemorrhage syndrome, blood transfusion should not be employed until it has been proved that the kidneys are functioning reasonably well. Plasma transfusion is likewise contraindicated in the first instance. In days gone by, many cases of shock were successfully tided over the critical period by infusion of crystalloid as opposed to colloid solutions. Therefore it is advised to rely upon the administration of intravenous saline or better still 5 per cent glucose, combined with injection of pressor substances, *e.g.*, desoxycorticosterone, until a flow of neutral or alkaline urine has been established. Once the kidneys have been protected, plasma or, if necessary, blood can be gravitated into a vein with confidence and benefit.

D. *Anuria is established.*

A considerable experience of anuria in civil surgery has convinced me that to sit with folded hands and hope that the patient will pass urine is rarely rewarded by anything but remorse that more active treatment was not started earlier. In the

* Crooke's Collosols put up these drugs combined ready for use in ampoules.

anuria of the crush syndrome the problem of rational treatment is easier than in cases occurring in civil practice where an obstructive lesion, *e.g.*, calculous anuria, must be eliminated before attempting to stimulate renal functions. There seems to be no reason for not proceeding in precisely the same manner as in nonobstructive anuria from other causes:

1. Ascertain whether low blood pressure is the cause of the anuria (prerenal anuria). If the blood pressure is very low concentrate on endeavoring to raise the blood pressure but observe the stipulations detailed under sub-heading C.

2. If the blood pressure is adequate, administer isotonic sodium sulphate (4.28 per cent) intravenously very cautiously, and not exceeding 1 to 1½ pints unless the urinary flow is reëstablished. While this is proceeding, hot packs are applied to the loins. The administration of standard doses of adrenal cortical extracts subcutaneously cannot be harmful and in the opinion of many is of considerable benefit.

3. Take the patient to the operating theater and administer a small (half) dose of spinal anesthetic. A spinal anesthetic, of itself, has been shown to terminate reflex anuria, but an additional reason for giving the spinal anesthetic is that it will help to make cystoscopy painless. Through the cystoscope ureteric catheters are passed, and we wait for a full quarter of an hour to see if urine drips from the catheters. On many occasions this enterprise has been rewarded. When proof that renal function has awakened is forthcoming, we proceed to coax the renal epithelium to activity; sodium sulphate (4.28 per cent) or, alternatively, 5 per cent dextrose is given intravenously, in proportion to the urinary output.

4. When the above measures are unsuccessful, carry out renal decapsulation with the patient in the completely prone position. There appears to be too much hesitation in performing this operation. With the area already partially anesthetized by the spinal anesthetic, local infiltration is perfectly satisfactory. One kidney should be exposed and decapsulated without delivery of the organ, and if all goes well the other side can be treated similarly. If Mayo's incision is employed, there is no necessity to suture the wound or wounds save only for a few skin stitches.

BIBLIOGRAPHY

1. Beall, D., et al.: Brit. M. J. *1*:432, 1941.
2. Benison, R. L.: Lancet *2*:776, 1941.
3. Blackburn, G., and Kay, W. W.: Brit. M. J. *2*:475, 1941.
4. Bywaters, E. G. L.: Brit. M. J. *2*:29, 1941.
5. Bywaters, E. G. L., and Beall, D.: Brit. M. J. *1*:427, 1941.
6. Bywaters, E. G. L., and Dible, H.: J. Path. & Bact. *54*:111, 1942.
7. Cohen, S. M.: Brit. M. J. *1*:570, 1941.
8. Curphey, E.: Brit. M. J. *2*:176, 1941.
9. Duncan, C. W., and Blalock, L. A.: Ann. Surg. *115*:684, 1942.
10. Eggleton, M. G.: Brit. M. J. *2*:495, 1942.
11. Harris, H. A.: Brit. M. J. *1*:491, 1941.
12. Henderson, R. G.: Brit. M. J. *2*:197, 1941.
13. Hill, Sir Leonard: Brit. M. J. *1*:491, 1941.
14. Longland, C. J., and Murray, J.: Lancet *2*:158, 1941.
15. Maitland, A. I. L.: Lancet *2*:446, 1941.
16. Mayon-White, R., and Solandt, O. M.: Brit. M. J. *1*:434, 1941.
17. Patey, D. H., and Robertson, J. D.: Lancet *1*:780, 1941.
18. Patey, D. H., and Robertson, J. D.: Brit. M. J. *2*:212, 1942.
19. Rennie, J. B.: Brit. M. J. *1*:644, 1941.
20. Shaw Dunn, J., et al.: Lancet *2*:549, 1941.
21. Shepherd, J. A.: Roy. Nav. Med. Serv., No. 4, *28*:314.
22. Tomb, J. W.: Brit. M. J. *2*:495, 1942.

SUMMARY

First aid and general treatment of crush syndrome are discussed. Cases are divided into four categories: those in which the patient is not severely shocked; those in which the patient is unquestionably suffering from oliguria; cases of severe shock; cases in which anuria is established. In Group I measures are usually preventive. In cases of oliguria, alkalinization is recommended. Patients with severe shock should be given a preliminary injection of intravenous saline or glucose followed by blood or plasma transfusions when the kidneys are functioning well. If anuria is established, the patient should be treated as in nonobstructive anuria from other causes.

SUMARIO

Se discute el primer auxilio y el tratamiento general del síndrome de compresión (magullamiento). Los casos son divididos en cuatro categorias: Aquellos en que el paciente no está severamente choqueado; aquellos casos en que el paciente esta indudablemente sufriendo de oliguria; casos de choques severos y casos en que la anuria está establecida.

En el primer grupo el tratamiento es generalmente preventivo. En casos de oliguria, alcalinización se recomienda. En los casos de choques severos deberán recibir una injección preliminar salina entravenosa o de glucosa, seguida por transfusión de sangre o de plasma cuando los riñones funcionan bien. Si anuria existe, el paciente deberá recibir el mismo tratamiento que en anuria (sin obstrucción) y de otras causas.

RÉSUMÉ

L'auteur discute le traitement d'urgence et le traitment général des écrasements. Il classifie les cas en quatre catégories: (1) les cas dans lesquels les blessés ne sont pas en état de choc sévère; (2) les cas dans lesquelles les blessés souffrent d'oligourie; (3) les cas de choc profond; (4) les cas d'anurie persistante. Dans le premier groupe, le traitement est préventif. Dans les cas d'oligourie, l'alkalinsation est préconisée. Dans les cas de choc profond, si les reins fonctionnent bien on donnera des injections intraveneuses de sérum artificiel, additionné de glucose, suivies de transfusions de sang ou de plasma. Si l'anurie est établie, le malade recevra le traitement indiqué dans toute anurie nonobstructive.

Выводы

Эта статья обсуждает первую помощь и общую методику лечения синдрома возникающаго в повреждениях причинненых сокрушающим давлением. Все случаи разделены на четыре категории: 1. те, которые не сопровождены сильным шоком, 2. те, в которых безусловно присутсвует уменьшение мочи (oliguria), 3. случи очень сильнаго шока, 4. случаи полнаго отсутствия мочи (anuria). В первой группе применимы главным образом предохранительныя меры. В случаях уменьшения мочеизделения рекомендуется алкализация. Пациентам с глубоким шоком необходимо дать сначала интравенозное вспрыскивание нормальнаго соляного раствора или глюкозы, а затем, если почки работают, перелив крови или плазмы. В случаях полной анурии, лечение тоже самое как и во всех случаях анурии не механическаго произхождения.

ACKNOWLEDGMENTS

The *Journal* wishes to acknowledge receipt of the following publications sent to the Editorial Department:

Argentina

Boletín del Instituto de Clínica Quirúrgica (Buenos Aires) Año XIX, Nos. 161 and 162, Oct.-Nov. and Dec., 1943.

Boletines de la Sociedad de Cirugía de Rosario (Rosario) Año X, Nos. 5-6, Aug.-Sept., 1943.

La Revista de Medicina y Ciencias Afines (Buenos Aires) Año VI, Nos. 1, 2 and 3, Jan., Feb. and Mar., 1944.

Revista Argentino-Norteamericana de Ciencias Médicas (Buenos Aires) Año I, Nos. 7 and 8, Nov. and Dec., 1943.

Revista de la Sanidad Militar (Buenos Aires) Año XLIII, Nos. 2 and 3, Feb. and Mar., 1944.

Brazil

Anais Paulistas de Medicina e Cirurgia (São Paulo) Vol. XLVI, No. 6, Dec., 1943; Vol. XLVII, Nos. 1 and 3, Jan. and Mar., 1944.

Boletim do Sanatorio São Lucas (São Paulo) Vol. V, No. 6, Dec., 1943.

Brasil Médico (Rio de Janeiro) Año LVIII, Nos. 1, 2, 3, 4 and 5, Jan., 1944; Nos. 10-13, Mar., 1944.

Gazeta Clínica (São Paulo) Año XLI, No. 11, Nov., 1943.

Jornal dos Clinicos (Rio de Janeiro) Año XXIV, No. 1, Vol. 25, 1943.

(Continued on page 352)

Naval Medical Research in Wartime*

REAR ADMIRAL WILLIAM L. MANN, M.C., U.S.N.
NAVAL MEDICAL RESEARCH INSTITUTE
NATIONAL NAVAL MEDICAL CENTER
BETHESDA, MARYLAND

IN THIS war, more particularly than in previous conflicts, medical officers in the United States Navy serving *afloat, afield* and with *aerial* units have many new problems which demand study and research. Fighting men must survive and function effectively in extremes of environment from Icarian heights to cetacean depths, from Arctic frigidity to tropical torridity, from monotonous calm to explosive blast. The tempo of modern fighting is now paced by the whirring of propellers and the whirling of wheels instead of the slow tramp, tramp of marching feet.

The corridors of war are vibrant with the deafening roar of motors, redolent of petroleum fumes, and illumined by the Martian flash of new machines of war. Modern warfare presents medical problems *sui generis,* which have no counterpart in times of peace, and their solutions are characterized by a quality of immediacy. Thus research during war has two special attributes: first, the problems grow out of, and are formulated by wartime experience; and second, the economy of time is such that a workable solution today is more to be desired than a complete answer tomorrow. Our research activities are therefore marked by practicality, applicability and speed. The motivation to research is the desire to contribute in every way possible to the winning of this war, and not merely the satisfaction of an intellectual curiosity. *Fundamental* research must now be secondary to *applied* research.

Naval medicine is an ancient art and a modern science. Science discovers and formulates principles; art applies these principles to practical use. Hence, for the development of the science of Naval Medicine, the medical officers of the Navy must conduct their own research and investigation while guarding the health of Naval personnel.

Medical research in the Navy is not a new function, but has been carried on for years in many naval establishments. The Naval Medical Department maintains research facilities in Aviation Medicine at Pensacola, in Submarine Medicine at New London, as well as various projects in addition to routine duties in naval hospitals and other naval medical activities.

All research in naval medicine is coördinated under the Research Division of the Bureau of Medicine and Surgery. One of our outstanding and most able medical officers, Rear Admiral H. W. Smith, (MC), U.S.N., (Retired), is in charge of the Research Division and coordinates the research activities of the Medical Corps. He also acts as the naval medical representative and liaison officer to other national and international research groups.

The Surgeon-General of the Navy, Vice-Admiral Ross T. McIntire, is per-

* Presented at the Fourth International Assembly of the International College of Surgeons, New York, June, 1943.

sonally interested in naval medical research. It is largely through his interest, initiative and foresight, that a broad program of research has recently been developed and that the Institute was founded and dedicated to strengthening the rôle of the Medical Department in accomplishing its mission, that of keeping "the *most* men at the *most* guns for the *most* days."

The Naval Medical Research Institute, established and commissioned on Navy Day, October 27, 1942, is now the central and primary focus of naval medical research. Since I am more familiar with the development and work of this research unit, the major part of my remarks will be confined to its rôle in promoting advances in Naval Medicine.

The Naval Medical Research Institute is located at Bethesda, Maryland, as an integral part of the National Naval Medical Center, and is staffed by officers of the Naval Medical Service and civilian scientists. Its primary purpose is to solve military medical problems through coördinated and coöperative research. The Institute is housed in three adjacent buildings, two of permanent construction and one of temporary nature. To facilitate administration and to expedite the work of the Institute, the organization is partitioned into division and departmental laboratory groupings.

There are divisions of:

1. Naval Ecologic Medicine
2. Naval Preventive Medicine
3. Dental Research
4. Equipment Research.

The laboratory groups comprise:

1. Biophysics, Special Senses, and Applied Psychology
2. Nutrition and Biochemistry
3. Microanatomy, Pathology, and Electron Microscopy
4. Microbiology, Bacteriology, and Virology
5. Physiology, Pharmacology, Toxicology, and Experimental Surgery
6. Environmental Compartments; High Altitude, Deep-Sea and Psychrometric Chambers
7. Dentistry
8. Biometrics.

The projects are classified into:

1. General—affecting the Navy as a whole
2. Maritime Medicine—surface vessels
3. Submarine and Diving Medicine
4. Aviation Medicine
5. Field Medicine—*i.e.*, Medical Service with the U. S. Marine Corps.

The staff of the institute is composed of:

1. 30 Commissioned Officers
2. 10 Wave Officers
3. 5 Civilian Scientists
4. 50 Hospital Corpsmen
5. 25 Enlisted Waves.

It may be of interest to enumerate and describe briefly some of the special equipment and facilities that the Institute affords. The low pressure chamber is capable of attaining a simulated altitude of 60,000 feet, with its corresponding low temperature of −67° F., within fifteen minutes, starting at atmospheric pressure and ambient temperatures. A high pressure chamber in the diving unit may be used to simulate dives to a depth of 1000 feet, equivalent to a pressure of 500 pounds per square inch. At hand are gas-mixing rooms where gas mixtures of any combination may be compounded and properly mixed under high pressures. These gases, such as helium-oxygen mixtures, will be used for experimental work in diving and submarine medicine. The laboratories of psychometry are designed to produce temperatures of 0° F. to 120° F., with a control of one degree and humidities range from zero to 100 per cent, with a control of 1 per cent. Treadmills, ergometers and spirometers are used to study the "man-o-wars" man

in relation to his external environment. Nutrition, water and salt metabolism and clothing are some of the directions research is taking in this division.

An air-conditioned compartment was especially designed to house the electron microscope, which is now in daily use.

Through years of experience industrial corporations have learned that "the foundation of research work lies in the quality of the minds of the investigators and the freedom and tranquillity permitted for the use of their abilities," and that the cost of research is repaid many times in the commercial value of discovery. Medical research is not to be excepted in these respects, for it is recompensed not alone by monetary returns, but also by human values. One example may be given from the investigations of the Naval Medical Research Institute, namely, our attempt to obtain drinking water from sea water.

The plaint which issued from the parched lips of The Ancient Mariner,

> "Water, water everywhere,
> And all the boards did shrink!
> Water, water everywhere,
> Nor any drop to drink."

need no longer be the wail of shipwrecked men, for Elysian visions of sweet water flowing from the briny billows of the sea to quench their intolerable thirst are now a reality. For the first time in history, an effective, simple chemical method of demineralizing sea-water has been achieved—an unique and invaluable contribution to the morale and physical welfare of our fighting men, that alone will repay the cost of the Naval Medical Research Institute and justify its establishment.

The United States Navy is utilizing to the fullest extent its facilities and scientific personnel in the study and solution of urgent medical problems arising from military action and need, to the end that wounds of war may be healed and the ways of peace be hastened.

In conclusion, it may be stated before this assembly of surgeons, that surgery is most interrelated with war and this relation existing between the military and surgical professions has been recognized since the days of the Ancients. In fact, one great military writer has resorted to medical and surgical terminology and has defined war as an "Epidemic of Trauma."

It therefore seems appropriate that the operating surgeon must cope with this epidemic of personal injuries created by the modern implements of human destruction.

An interesting fact is involved in the functions of surgery in war. While other activities and agencies are conducting research to create newer and greater instruments that will increase the rate of human destruction, the medical and surgical professions have initiated research to develop improved methods to diminish and to repair, on friend and captured foe, the effects produced by the newer weapons of war during this "Epidemic of Trauma."

SUMMARY

Naval medical research in wartime has several particular attributes: (1) the problems arise from the exigencies of war; (2) the solution must be immediate rather than final; (3) fundamental research is subordinate to applied research. The work is carried on by the Research Division of the Bureau of Medicine and Surgery at the Naval Medical Research Institute at Bethesda, Maryland.

SUMARIO

Estudios navales-médicos, en tiempo de guerra, tienen ciertos atributos particulares:

1. Los problemas originan en las exigencias de guerra.
2. La solución de dichos problemas es inmediata y no remota.
3. La investigación fundamental está subordinada a la práctica aplicada.

El trabajo es continuado por el Departamento de Investigación de la Oficina de Medicina y de Cirugía del Instituto Naval Médico en Bethesda, Maryland.

RÉSUMÉ

Pendant la guerre, les recherches médicales de la marine sont influencées par trois considérations: (1) Les problèmes sont suggérés par les exigences de la guerre. (2) Les solutions doivant être immédiates plutôt que finales. (3) Il importe que les recherches soient fondamentales. Toutes ces études et recherches reçoivent l'attention du "Research Division of the Bureau of Medicine and Surgery" de l'Institut Navale de recherches médicales de Bethesda, Maryland.

Выводы

Флотская медицинская научно-исследовательная работа характеризуется несколькими особенностями:

1. Задачи возникают на почве неотложных военных нужд.

2. Решение должно быть более немедленным чем окончательным .

3. Основной научный розыск подчинен прикладному розыску. Эта работа выполняется научно-исследовательным отделом медицинско-хирургическаго комитета при Флотском Медицинском Исследовательном Институте в Бетесда, Марыланд (Research Division of the Bureau of Medicine and Surgery at the Naval Medical Research Institute, Bethesda, Maryland).

ACKNOWLEDGMENTS

(Continued from page 348)

O Hospital (Rio de Janeiro) Vol. 25, Nos. 2, 3 and 4, Feb., Mar. and April, 1944.

Revista Clínica de São Paulo (São Paulo) Vol. XIV, No. 6, Dec., 1943; Vol. XV, No. 1, 1944.

Revista de Ginecologia e d'Obstretricia (Rio de Janeiro) Año XXXVIII, Nos. 1, 2 and 3, Jan., Feb. and Mar., 1944.

Revista Medico-Cirurgica do Brasil (Rio de Janeiro) Año LII, No. 1, Jan., 1944.

Chile

Revista de Medicina (Valparaiso) Año XVII, Mar., 1944.

Colombia

Medicina y Cirugía (Bogotá) Vol. VIII, No. 8, April, 1944.

Costa Rica

Revista Medica de Costa Rica (San José) Año XI, Nos. 114, 115 and 116, Oct., Nov. and Dec., 1943; Año XI, No. 118, Feb., 1944.

Cuba

Boletín Mensual del Hospital de la Policia Nacional (Havana) Vol. III, Nos. 1, 2 and 3, Jan., Feb. and Mar., 1944.

Revista Médica Cubana (Havana) Tomo LV, Nos. 2 and 3, Feb. and Mar., 1944.

Revista de la Sanidad Militar (Havana) Año VIII, No. 1, Jan.-Feb.-Mar., 1944.

Revista de Tuberculosis (Havana) Año VII, No. 4, Oct.-Nov.-Dec., 1943.

Villaclara Médica (Santa Clara) Vol. XII, No. 2, Mar.-Apr., 1944.

El Salvador

Archivos del Hospital Rosales (San Salvador) Año XXX, July-Aug.-Sept., 1943.

Guatemala

La Juventud Médica (Guatemala City) Epoca III, Año I, Nos. 3 and 4, Mar. and Apr., 1944.

Mexico

Cirugía y Cirujanos (Mexico, D. F.) Tomo XI, No. 12, Dec., 1943.

Cuadernos de Mineralogía y Geología (Tucuman) Tomo III, No. 10, Dec., 1943.

Excerta Medica de la S.C.O.P. (Mexico, D. F.) Tomo II, No. 4, July, 1943.

Gaceta Médica (Villahermosa) Año VI, 64 and 65, Apr. and May, 1944.

Revista del Instituto de Salubridad y Enferme-

(Continued on page 376)

Surgeons and Events

by

DR. MAX THOREK

GUILLAUME DUPUYTREN—(1770-1835)

GUILLAUME DUPUYTREN, one of the most scintillating stars of French medicine, first saw the

Guillaume Dupuytren.

light of day on Oct. 5, 1777 in the village of Pierre Buffière in the Haute Vienne district about eighteen miles from Limoges.

Guillaume's father, a lawyer of scant means, sent him to the *Collège of Magnac-Laval.* At the age of twelve the lucky star which seemed to guide the boy throughout his life first shone on him. A certain Captain Keller was so impressed by Guillaume's good looks and intelligence that he requested and obtained permission from Guillaume's father to educate the lad. The captain's brother was principal of the *Collège de la Marche,* and there Guillaume was sent, where, it may be noted in passing, he was a poor Latin student.

At sixteen he wanted to become a soldier, but his father intervened and made him study medicine, this although he made no provision for the young student's maintenance. Many a time as a medical student at the *Ecole de Médecine* in Paris, Dupuytren went without food and clothing and was forced to spend many hours of the cold winter days in bed to keep warm. However, his spirit of pride and independence made Dupuytren indignantly refuse all offers of aid.

At the age of eighteen he obtained the position of prosector at the newly established *Ecole de Santi.* The post carried with it a salary of 2000 francs, but the course of the Revolution had caused the paper currency to so depreciate in value that Dupuytren wrote home for six crowns, which his mother indignantly refused him. In these early misfortunes we may see the foundation for that bitterness of spirit which he carried to the grave, even though fame and fortune

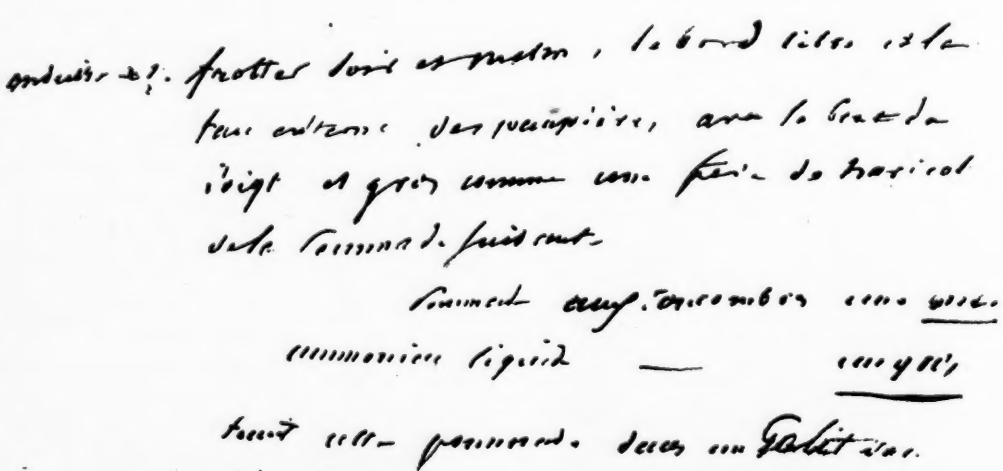
smiled on him for many years. The Revolution, however, did thus early in his career furnish him with some experience in war surgery when the Parisian upheaval of 13 Vendémiaire, 1795, provided him with wounded to attend.

For several years his work was centered about the *Ecole de Santi*. Corvisart and Leroux gave him full charge of autopsies at the school. Through his teaching connection his name was listed as a member of the *Société Médicale d'Emulation* (1797). In 1799 the opportunity was afforded him of carrying out some anatomical research with Leclerc. In 1800 Dupuytren was conscripted into the Army, but the faculty of the *Ecole de Santi* valued his services sufficiently to obtain his exemption.

In 1801 Dupuytren became chief of the anatomical work, privileged to study with Chaussier. He discovered the canals of the diploe. At this time Dupuytren became an ardent admirer of Bichat, who was laying the foundations of modern pathology, and decided to turn his attention to pathology.

In 1802 recognition began to come to Dupuytren when he was named surgeon of the second class at the Hôtel Dieu. In 1803 he founded the *Société Anatomique*. Bayle began to write up some of the work being done in pathology, and Dupuytren demanded that he be named as the founder of pathology in place of Bichat, who had recently died and eliminated himself thereby as a rival, falsify-

(Continued on page 369)



Medical notes in Dupuytren's handwriting and bearing his signature. (From the author's collection.)

Cesarea Extraperitoneal en Distocias Provocadas por las Partes Blandas de la Pelvis y en Mujeres Infectadas*

(Indications for Extraperitoneal Cesarean Section in Certain Cases of Dystocia of the Soft Parts and in Infected Women)

BERNARDO J. GASTÉLUM, M.D.
MEXICO, D. F.

(PART I)

SUMMARY

Emphasis has been placed on the significance of dystocia of the soft parts, which, as Döderlein has stressed, may at times assume the importance of those due to deformities of the osseous pelvis, by interfering with the descent of the fetus and even making its delivery impossible through the natural channels.

When the obstetrician overlooks an existing dystocia of the soft parts, the parturient woman is frequently submitted to various examination and vaginal manipulations that lead to a treatment of expectancy in the hope of a natural delivery. This unnecessary prolongation of labor favors the excessive traumatization of the birth canal and exhaustion of the mother which, at times, endangers her life and that of the baby. It is in these infected cases, with a ruptured bag of waters and threatening fetal asphyxia, but who still possess powerful uterine contractions, that the extraperitoneal cesarean section is indicated.

It is the opinion of the author that the extraperitoneal cesarean section should be performed in all cases in which it is indicated, and, eventually, despite its technical difficulties, it will become the procedure of choice, in a manner similar to the present acceptance of the lumbar route in nephrectomies. Waters' idea, applicable to all cases, is the one that should prevail over all the others that have inspired the procedure of extra-peritoneal cesarean section.

CUANDO el partero es llamado a examinar a una mujer embarazada tiene presente entre las dificultades que puedan imposibilitar el parto, aquellas que se refieren especialmente a la pelvis ósea, al feto mismo, al estado general de la paciente. No le pasa por la imaginación anomalías que se refieran propiamente, a las partes blandas de la hilera genital, a menos que estas alteraciones constituyan ese cuadro de la patología de las partes blandas que enumera los textos de obstetricia: conglutinación del orificio uterino, hematomas de la vulva, de la vagina, vaginismo, estenosis cicatriciales de la vagina y del cuello uterino, prolapso, anomalías del cordón, de la contracción uterina, rigideces del cuello, distocias de naturaleza placentaria, etc. etc., agréguense a éstas, los trastornos a que dan lugar las intervenciones quirúrgicas, los traumatismos, el uso de caústicos o de otros métodos traumatizantes. Todos estos antecedentes cada autor los ordena a su manera; distocia del canal, del móbil, de las partes blandas maternas etc; o bien,

* Presented at the Third International Assembly of the International College of Surgeons in Mexico City.

anomalías de la pelvis ósea, de la vías blandes del parto, de la contractilidad, de la forma y tamaño del facto, etc. El caso es, que si faltan estos antecedentes referidos a las partes blandas pero de tal importancia que por sí mismos llaman la atención, el tocólogo no hace ninguna investigación del conducto perineovagino uterino.

Pues bien, hay que preguntarse y responder sinceramente a la pregunta, ¿cuántas ocasiones ha tropezado el tocólogo con vicios de la pelvis ósea o esos padecimientos de las partes blandas a que acabo de referirme y que le hagan difícil o imposible el parto? De ordinario, cuando esos padecimientos existen son conocidos previamente, trombus de la vulva y de la vagina, placenta inserta anormalmente, desprendimiento previo de la placenta, feto de gran tamaño, duplicidad de los órganos, etc., lo que sorprende ordinariamente es, que un embarazo que ha evolucionado normalmente, y una mujer que no presenta las alteraciones anatomo-patológicas a que me he referido, de constitución ostensiblemente normal, el parto no se verifique como se esperaba; se vuelve intempestivamente difícil, frecuentemente imposible, teniéndose que recurrir en más de una ocasión a métodos quirúrgicos aparentemente desproporcionados a los antecedentes. Esto quiere decir por lo tanto, que además de esos obstáculos al parto determinados por padecimientos o accidentes de las partes blandas, dándole a este concepto la extensión que le asigna Kroning, pues todo lo que no es óseo tiene que ser parte blanda, y como obstáculos provocados por partes blandas en el parto, se señala justificadamente tanto al prolapso del cordón, como a las presentaciones oblicuas por inserción baja de la placenta, existen otras dificultades opuestas por las partes blandas al descenso del feto, que no por no ser obstensibles, dejan de tener la máxima importancia en el desarrollo del parto. Que estos impedimentos eran conocidos desde hace varios siglos, nos lo enseña el famoso caso del carnicero Jacob Neufer, de Sigershanser, Suiza en 1500, que operó a su mujer embarazada por primera vez y que después de varios días de trabajo y con dolores espantosos, en presencia de matronas y prácticos de talla, abre el vientre como estaba acostumbrado hacerlo en la castración de los cerdos y extrae un niño que vive 77 años. Sutura la herida al modo veterinario, y la mujer vuelve a tener gemelos y cuatro partos más, lo que comprueba que la causa de la imposibilidad del primer parto, no era la estrechez de la pelvis ósea, sino la de las partes blandas. Y son á estos obstáculos, a los que voy a referirme en esta ocasión.

Para que el feto salga, el canal uterino vagino perineal habrá que dilatarse alrededor de treinta y cuatro centimetros; esta distensión de los tejidos en el estado ordinario parece desusada, tan poco elásticos se manifiestan y tanta es la resistencia que vencer para distenderlos. Pues bien no reflexionamos, tan natural es el parto, que estos tejidos pueden oponer resistencia a la marcha del feto e interrumpir su descenso. Que una vulva se abra más adelante o más atrás del eje pélvico, ocasiona también la misma dificultad. Por lo tanto del canal perineovagino-cervical, depende fundamentalmente el futuro del parto, de las partes blandas de este canal que no tomamos en serio, para referir a ellas el retardo en la marcha del trabajo.

De las partes blandas que constituyen la hilera genital, capaces de oponerse a la propulsión del feto, por las contracciones utero-abdominales, por orden de su importancia, tenemos; las fibras musculares circulares que forman el cuello uterino, el elevador del ano por sus inserciones a los bordes de la vagina, los músculos que forman propiamente la

vagina, el músculo constrictor de la vagina que se continúa con el esfinter externo del ano formando una especie de ocho, de modo que las contracciones de estos músculos son solidarias; el psoas y los vasos, ilíaca y vena externa cuando son muy salientes, reducen los diámetros oblicuos y transverso del estrecho superior; no son menos importantes los diámetros del estrecho inferior o de la parte superior de la pelvis blanda, éstos diámetros son extraordinariamente dilatables gracias al apartamiento de los músculos elevadores y a la retropulsión del cóccix, de éstos diámetros del estrecho inferior, el transverso limitado en el esqueleto por las caras internas de los isquions, es disminuído en algunas ocasiones por el desarrollo de los músculos obturadores internos y la grasa isquio-rectal, sobre la aponeurosis del obturador algunas veces se desarrollan pequeños fibromas.

La pelvis blanda es un canal formado por músculos y aponeurosis que se insertan sobre la pelvis osteo-ligamentosa, esta pelvis es amplia cuando pasa el feto, su importancia ha sido reconocida desde los viejos trabajos de Fabbri, Sabatier, etc. La pelvis blanda presenta exteriormente tres orificios, uretral, vaginal y anal; la porción comprendida entre la vagina y el ano y entre éste y el coccix se llama perineo, anterior y posterior, estos dos perineos sufren una ampliación considerable en el momento de la expulsión del feto, pero aunque no se dilaten no constituyen, como asegura Crosse, un verdadero obstáculo para la salida del feto. De los orificios que acabamos de mencionar, el que nos interesa es el vaginal, con un diámetro cocci-subpubiano de ocho centímetros, y un transverso, de cuatro centímetros, el músculo elevador especie de diafragma invertido en forma de embudo constituye la capa profunda del piso perineal, la capa superficial es menos importante para obstaculizar al feto y la forman, el músculo transverso del perineo, que va de las caras laterales de la vagina a la cara interna del isquión también al esfinter anal, el constrictor de que ya hablamos lo mismo que el esfinter, los bulbos e isquio cavernosos.

La aponeurosis forman dos planos aproximados y confundidos hacia adelante y atrás, pero distintos y distantes en la parte media, por sí mismas excepcionalmente dificultan la propulsión fetal. Pues bien, una resistencia indebida de estas partes blandas al impulso del utero, conduce si la contracción es potente, y no cesa, a desgarros del segmento inferior del utero, si hay cierto equilibrio entre la resistencia de las partes blandas y la fuerza utero abdominal, el trabajo se detiene, se alarga, continuándose cuando la resistencia de las partes blandas es vencida, pero si esta resistencia es mayor que el impulso uterino, entonces el trabajo cesa y llegan poco a poco para la madre los trastornos de la fatiga obstetrica y de asfixia y muerte para el niño. El caso típico es este: un parto que principia y que todo hacía presumir un caso normal, intempestivamente se entrampa, el cariz de los hechos acaba con la primitiva alegría, la situación se vuelve oscura y hay que obrar.

Seitz, calcula que de dos millones de niños que nacen en Alemania, de diez y seis a veintemil mueren por dificultades de las partes blandas y que un tratamiento apropiado podría salvar cuando menos doce mil. Formó una interesante estadística, por la que, de lós niños que mueren el 65 por ciento lo deben a obstáculos de las partes blandas, y el 20 por ciento a estrecheces pélvicas. Si por lo visto son las partes blandas las que dificultan el parto en mayor porporción que lo que lo hace la pelvis y los padecimientos que con anterioridad mencioné, hay que preguntarse, ¿como ob-

stáculos al parecer tan deleznables son capaces de oposición tan seria?

Porque de los elementos musculares enumerados, los músculos del cuello uterino y el elevador del ano son los que realmente tienen importancia. También y muy trascendente los propios músculos del utero, porque esta musculatura es el factor determinante de la propulsión del feto.

Presenciamos hechos paradójicos: una mujer bien musculada, produce contracciones uterinas débiles en el momento del parto, y en otra de contextura delgada, su trabajo es notoriamente eficiente.

La causa de las contracciones uterinas en el parto es un fenómeno insuficientemente dilucidado, se atribuye a secreciones internas, estímulo de las terminaciones nerviosas, etc.; la histerografía interna y externa aplicada a su estudio, como medio para establecer una terapéutica medicamentosa del trabajo, no ha conducido a resultados prácticos y continúa como procedimiento de laboratorio. Fabre.

Con la debilidad de las contracciones uterinas se constituye una entidad patológica, la inercia, que puede revestir diversos grados, tanto por lo que se relaciona a la intensidad de los dolores del útero como a su duración; hay inercias transitorias, son una especie de pausa en el trabajo uterino, una vez recuperada la contractilidad por el descanso, el trabajo se reanuda y el parto termina felizmente. En otras ocasiones, aunque raras, no se reanudan las contracciones del útero, parece como si su energía se hubiese terminado definitivamente y este suceso puede ocurrir en el período de dilatación o en él de expulsión, por sí misma la inercia no es una razón para hacer una cesarea según Winter, y agrega, el tocólogo puede enjuiciar las causas determinantes de la debilidad de las contracciones y de la paralización del parto. La indicación para "cesarear", expresión que usa, solo puede justificarse por otras causas unidas a la anterior, es decir a la inercia.

La consistencia blanda del útero grávido de los primeros meses, es sustituída por su dureza debida a las contracciones intermitentes; el espesor de las fibras varía según la región y la época del embarazo. La porción inferior es más delgada que el resto del órgano, la pared uterina durante los cinco primeros meses engruesa por la hipertrofia del tejido muscular, y durante los cuatro últimos meses hay un adelgazamiento de este tejido posiblemente debido a su distensión. Fabre. Pero estas investigaciones hechas en mujeres muertas, si bien nos sirven para conocer los cambios anatómicos del tejido muscular uterino en la época del embarazo, no nos dan los medios de presumir lo que parará en una embarazada. Cuando la falta de contracciones uterinas o su debilidad no puede referirse a algún padecimiento ostensible, sino que radique en los centros nerviosos del utero, en su insuficiente desarrollo muscular o en la ausencia de las hormonas o substancias diversas que excitan la fibra, ¿como precisarlo? Lo que debemos hacer cuando no existan lesiónes que lo expliquen es agotar teoricamente en cuanto a la causa, la terapéutica recomendada como eficáz.

El límite de la onda muscular uterina estudiada hace muchos años por Pinar, se encuentra en el anillo de Schroder o de Bandl; hacia abajo el segmento es limitado por el orificio interno del cuello llamado obstétrico o mecánico. La mucosa cervical alcanza muchas veces una región más alta que la del orificio obstétrico, lo que prueba que una parte del cuello, Fabre, entra en la constitución del segmento inferior, lo que nos interesa desde el punto de vista de la contracción uterina, porque ésta solo

alcanza hasta el sitio donde principia el segmento y por lo tanto el cuello y la porción del utero que forma el segmento inferior son indiferentes en la propulsión del feto.

De la manera como se contituya el segmento inferior, de la situación del utero en relación a la pelvis y a los organos que contiene, depende la posición del cuello. Si este queda en el centro de la pelvis, dentro del diámetro pelviano, su posición es ideal para el parto; si el desarrollo del segmento se hace desigualmente a expensas de la cara anterior o posterior, el cuello será desplazado hacia el punto opuesto, atrás contra el promontorio si se dilata la región anterior, adelante, detrás, del púbis, cuando es la región posterior la que se dilata; esta porción dilatada se llama saciforme, es tan delgada que puede creerse que se toca la presentación. El cuello uterino puede conservar su longitud a pesar de la constitución del segmento o bién está aplastado. La desviación hacia adelante o atrás del cuello por la indebida formación del segmento, entorpece el trabajo sin llegar a interrumpirlo a menos que aparezca la inercia, y ordinariamente, el segmento termina por formarse de manera normal, regresando el cuello al centro de la pelvis, el mejor tratamiento es la expectación, no hacer tactos y cambiar de posición a la enferma.

Las modificaciones en la posición normal del útero, anteflexión, anteversión retroflexión, retroversión, y las laterodesviaciones, son obstáculos para el descenso fetal si se han producido más allá de cierto radio, pues hay que tener en cuenta para que el parto no se interrumpa, la coincidencia entre eleje uterino y los de la pelvis. Se consideran tres ejes pélvicos, el del estrecho superior o de encajamiento, lo constituye la perpendicular sobre el plano del estrecho superior; el de la excavación o de descenso de Fochier, que es la prolongación del anterior, termina hacia abajo entre la segunda y tercera pieza cóccica, se la representa por una línea que principia en el ombligo y termina en el cóccix, la cabeza sigue esta trayectoria al ser empujada por la fuerza uterina y por ella se guía el tocólogo en sus tracciones sobre el fórceps, se le llama eje práctico; el del estrecho inferior o de desprendimiento, que forma con el eje anterior un ángulo de cien a ciento diez grados y este eje es casi horizontal cuando la mujer está acostada, prolongado hacia atrás termina en el promontorio.

Las relaciones del eje uterino con el ombilico-cóccigio han dado lugar a varias controversias con conclusiones diferentes; Fabre admite que durante la contracción uterina, los dos ejes del útero y pelvis coinciden, fuera de esta contracción, el útero se encuentra sobre la columna vertebral y el eje uterino forma con el eje de la pelvis en el sentido antero-posterior un ángulo de diez grados abierto hacia atrás. Por el exámen de los cuerpos congelados de mujeres embarazadas, se comprueba esta situación muy posterior del útero, se trata de personas muertas en los últimos meses de la gestación. Además durante el embarazo, bien conocida es la posición del útero por las observaciones que ha dado la cesárea, está torcido hacia la derecha, de tal manera, que el borde izquierdo es anterior y la cara anterior ve a la derecha. Existe entorpecimiento del trabajo, por éstas anomalías de la estática uterina, cuando alcanza exageradas proporciones, lo desagradable para la enferma, es que se reconozcan demasiado tarde o pasen desapercibidas. En un 20 por ciento el eje longitudinal del útero corresponde a la linea media, en un 50 por ciento es oblicuo a la derecha y en un 30 por ciento sucede lo contrario; sin embargo estas modificaciones en la situación del útero pueden considerarse

como ordinarias, mas cuando el abdomen se encuentra fuertemente caído hacia adelante, este solo hecho ya es bastante no solo para determinar dificultades en el trabajo, sino para impedirlo. Debemos recordar además, que en los dos primeros meses del embarazo el útero se encuentra en anteflexión ligera, su aspecto es piriforme, después del tercero y cuarto mes es esférico, en los tres últimos meses se desarrollan las regiones inferiores que forman el segmento. Si las paredes abdominales son resistentes el utero es rechazado contra la columna vertebral y colocado atrás del eje del estrecho superior, si las paredes son blandas hace saliente adelante.

Los fuertes dolores de desgarramiento que sufre la parturienta, se deben principalmente, a la distensión de los tejidos de la pelvis; en personas jóvenes las cosas vuelven a su estado anterior con mucha rapidez, en mujeres de más de treinta y cinco años la elasticidad de los tejidos disminuye considerablemente, no se dilatan y cuando lo hacen se retraen con lentitud, quedando entre sus haces, vestigios cicatriciales de desgarraduras provocadas por la dilatación, que van a jugar desde el punto de vista de la dilatividad un papel importante en el próximo parto. Si llevamos a la obstetricia el concepto de degeneración del sistema vascular, de las vísceras y de los tejidos, que priva en medicina para explicar muchos padecimientos que solo son propios de la edad madura, y que en los jóvenes se deben a la exageración de los vicios de los que participa la mujer moderna; alcohol, tabaco, vida social y nocturna muy agitada, deportes, uso de modas que antes estaban solo reservadas al hombre, etc. etc., entonces tendremos como parturientas a jóvenes de edad, pero con los mismo inconvenientes que nos presentan las primíparas añosas y a las que Doderlein dedica consideraciones especiales.

Según las investigaciones de Bondy, la edad óptimo para el parto es de los diez y ocho a los veinte años admitiendo una amplitud fisiológica hasta los veintitres. Alrededor de los veinte años los tejidos son turgentes, distendibles, elásticos, tanto que después de considerables distensiones su normalidad se restablece pronto. Después de los veinticinco años comienzan las transformaciones regresivas de los tejidos que los conducen progresiva e insensiblemente a la rigidez característica de la edad avanzada; el tejido conjuntivo aumenta, esto varía de una persona a otra, hay quienes envejecen más pronto y frecuentemente el infantilismo se agrega al envejecimiento.

Después de los veinticinco años, la mayoría de las primíparas muestran diferencias clínicas manifiestas en el desarrollo del trabajo en relación a mujeres de menor edad. En este caso tenemos que considerar como un factor bien acreditado en la falta de elasticidad de los tejidos, la edad. Kashdan en mil parturientas de la clínica de Munich, la duración del trabajo encontró que aumentaba en la siguiente proporción:

Años	Horas
de 28 a 30	21
de 31 a 35	26½
de 36 a 45	28½

Las primíparas jóvenes tardaron generalmente diez y ocho horas. La rigidez de las partes blandas, provoca según Doderlein, la rotura prematura de la bolsa de las aguas en un 25 por ciento de los casos, y los desgarros perineales graves ocurren en un 10 por ciento, y leves en más de un 30 por ciento.

La rigidez de las partes blandas y el agotamiento de la parturienta que es la consecuencia, así como el obstáculo a la progresión del feto, son lo que determina el mayor número de intervenciones toco-

lógicas. Kashdan encuentra que todo esto aumenta con la edad, con la aproximación a los treinta y cinco y cuarenta cinco años:

Años	Se registran de intervenciones por ciente
de los 28 a los 30	8
de los 31 a los 35	15
de los 36 a los 45	20

El período del alumbramiento es muy afectado por la resistencia de las partes blandas tanto en las jóvenes como en las añosas; el útero se agota ante la resistencia de los tejidos, el feto estando ya rota la bolsa de las aguas corre el peligro de morir por asfixia debida a la reducción de la implantación placentaria y con ella la disminución de la superficie respiratoria del feto. Esta disminución de la superficie respiratoria, dice Doderlein, es la causa principal de las dificultades que sobrevienen al niño, en segundo término figuran las complicaciones por torción o compresión del cordón si la expulsión se alarga; según una estadística de Seitz, que comprende mil casos, si el período expulsivo pasa de una hora, 3.2 por ciento de fetos estan asfícticos; de una a dos horas 5 asfícticos y 1,4 muertos; de dos a cuatro horas, 10 asfícticos y 1,5 muertos; de cuatro a seis horas, diez y ocho asfícticos y 3,6 por ciento muertos y más de seis horas, 25 asfícticos y 6 por ciento muertos.

Estas cifras, asegura Doderlein, comprueban el peligro de la asfixia y muerte del feto con la prolongación del período de expulsión y dan una medida numérica de la importancia de las dificultades de las partes blandas y de su peligrosa influencia sobre el feto. Agréguese lo peligroso de los embarazos gemelares cuando hay resistencia de las partes blandas y de su frecuencia en las primíparas de edad, en relación a las jóvenes.

La falta de elasticidad del cuello uterino, la rigidez anatómica, cuello en hilo de Fochier, imposibilita el progreso del feto, y si los dolores continuan con fuerza, el segmento inferior del utero corre el riesgo de romperse; las otras variedades de rigidez, edematosa relacionada a la estrechez pélvica, la inflamatoria, la cicatricial, estamos familiarizados con ellas, sabemos evitar las y en la estrechez resolver el caso con anticipación.

La indistensibilidad de las partes blandas, se manifiesta por la prolongación del período expulsivo, el orificio uterino borrado, la cabeza desciende en la pélvis, pero el segmento superior de la vagina y la entrada a la misma, impiden el avance fetal. Hace muchos años Couvelaire, Pozzi, y algunos otros más, señalaban la estenosis anular del tercio superior de la vagina, refiriendo esta alteración del tejido a las anomalías del infantilismo. Una vulva demasiado chica y una vagina más estrecha que lo corriente, son obstáculos que ocurren con mucho mayor frecuencia que la que suponemos. Si la bolsa de las aguas se conserva, la rigidez del conducto cervical, la falta de dilatación del orificio uterino y la inextensibilidad de la vagina, no tiene trascendencia inmediata sobre el feto, solo si transcurre largo tiempo o la bolsa se rompe, empiezan para el niño los inconvenientes.

Hasta época reciente, los autores alemanes, principalmente, insisten como la inextensibilidad de las partes blandas, echan a perden un pronóstico excelente, en un parto en que la pelvis, la presentación, la ausencia de lesiones en el conducto genital, daban la certidumbre de que todo iría bien, refiriéndolo esencialmente a las primíparas añosas; en las mujeres jóvenes, se continúa olvidando como los tejidos suelen envejecer prematuramente. Y la rigidez de las partes blandas, dice Dorderlein, acarrea las mismas dificultades que en otros casos produce la estrechez pélvica.

(TO BE CONCLUDED IN NEXT ISSUE)

Nearthrosis Following Comminuted Fracture of the Elbow Joint

FELIX MANDL, M.D., F.I.C.S.*
JERUSALEM, PALESTINE

THE methods generally employed in the treatment of comminuted fractures of the elbow joint have not so far produced encouraging results, particularly if the fractures are compound. This is to some extent due to inadequate first aid, especially in rural districts. In the course of the last few years I have had the opportunity to treat two fractures of this kind, previously treated in other hospitals, both representing *ankylosis of the elbow joint* and also *pseudarthrosis of the lower end of the humerus.* Operative treatment of this condition takes a long time, and the results obtained are usually unsatisfactory.

Our method of procedure was, in these two cases, to convert the pseudarthrosis, which was just above the elbow region, into a nearthrosis for the purpose of effecting motility, while the ankylosed elbow joint was left untouched.

In both cases satisfactory functional results were obtained within a very short period of time, and both patients were able to resume their former occupations.

CASE REPORTS

Case 1. M., aged 28, policeman. On Mar. 30, 1939 he received a gunshot wound in his elbow which splintered the bone and opened the joint cavity. As to the previous treatment he received, we only know that he soon started running a temperature and had to be operated on —apparently for the second time—, that rubber drains were introduced into the wound and detached bone particles had to be removed. He wore a plaster-of-Paris splint for some time. On Oct. 22, 1939 he was admitted to my department. He presented a *pseudarthrosis just above the elbow joint with detached bone splinters. The elbow joint was perfectly ankylosed in 90 degree flexion.*

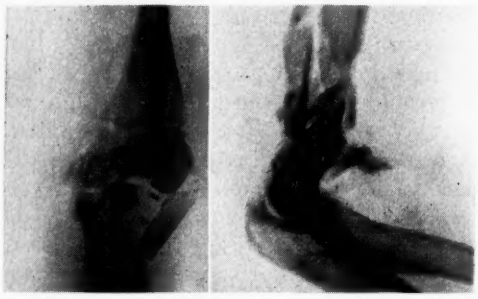


Fig. 1 (*a* and *b*). *Case 1.* X-rays of elbow taken immediately after accident resulting in comminuted fracture of the eblow joint.

On October 26, 1939 we removed a strip from the fascia lata and placed it in sterile saline. By posterior incision into the joint, the lower part of the humerus was exposed. The bone particles, which were only attached to each other by fibrinous material, were removed. The lower extremity of the humerus, which had lost both condyli, was then slightly sharpened, the periosteum scraped off and the flap of fascia sewn around the bone. The lowest point of the humerus just touched the distal fragment. The joint itself was not touched. After instillation of 4 gr. of sulfanilamide, a retentive dressing was applied. A fortnight later the plaster-of-Paris splint was removed. The patient was encouraged to try active motions. Biceps, as well as triceps, showed normal

* From Surgical Department B, Hadassah University Hospital, Jerusalem, Palestine.

function. At a later stage, passive movements, avoiding pain, were cautiously tried. After three months the entire range of active motion was 50 degrees, while passively 70 degrees were reached, and the patient was able to resume his duty as a policeman. The function of the joint constantly improved, so that after a year, flexion was possible up to 90 degrees.

Fig. 2. X-ray of elbow joint following institution of drainage. (Same case.)

Follow-up examination in 1942 showed active extension up to 180 degrees, active flexion to 80 degrees, all muscles well developed. Only if the arm is left hanging down and involuntary innervation eliminated, wobbling motions are possible. As soon, however, as the innervation of biceps or triceps sets in, lateral movement becomes impossible. Pronation as well as supination are disturbed. The arm is shorter than the other by 4 cm. For a considerable time the patient has again been working at his original profession. He is fully able to do everything required by his duty as a policeman (shooting, riding, drill).

Case 2. W., aged 45, locksmith. On Apr. 30, 1939 he received a compound fracture of the humerus in a motor car accident whereby the elbow joint was exposed. In another hospital the patient was operated on (bolting and wiring of the humerus). Twice he wore a plaster-of-Paris splint, each time for three months. On Jan. 17, 1942 he was admitted to my department. He presented a normally healed wound of the soft tissues in the elbow region. The joint was ankylosed in a position of 100 degrees flexion. Neither active nor passive movement was possible. The ankylosis,

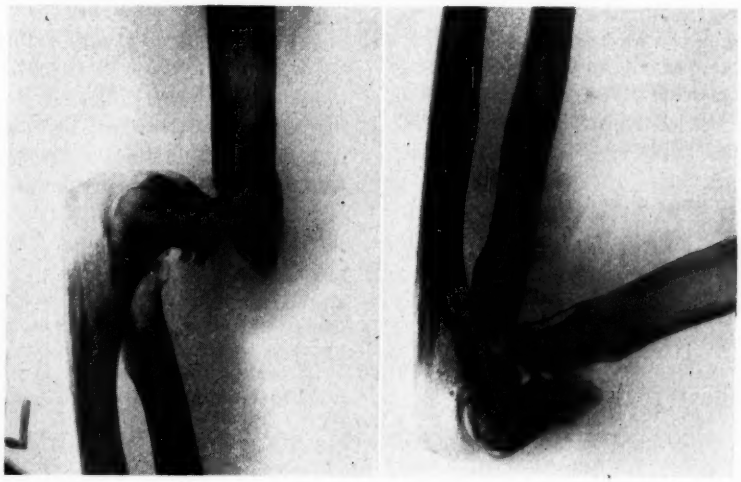


Fig. 3 (*a* and *b*). X-rays of elbow joint showing active flexion and extension. (Same case.)

judging from the x-ray appearance, was of the osseous type. Just above the elbow joint a pseudarthrosis had formed, within which passive flexion and extension up to 5 degrees was possible.

On January 10, 1940 the lower end of the humerus was exposed by lateral incision. Bolts and wires which were found there were removed. The lower end of the humerus, after having been slightly sharpened, was wrapped into a flap of fascia lata in the same way as outlined in *Case 1*, and the pseudarthritic gap widened. Sulfanilamide powder was then introduced, the wound closed and the arm placed in a plaster-of-Paris splint. The wound healed by first intention. Subsequent treatment consisted of the same measures outlined in *Case 1*. The motility of the joint improved constantly.

Follow-up examination in 1942 revealed active extension up to 150 degrees. The muscles were normal, though supination as well as pronation were somewhat hampered. Although working the whole day as a locksmith, the patient had no pain.

Unfortunately, a complete series of x-rays can only be given for *Case 1*, where Fig. 1 (*a* and *b*) (taken immediately after the accident) and Fig. 2 (taken after drainage of the joint) were kindly placed at my disposal. The last x-rays of this series were taken in our hospital, when the patient came in for a follow-up examination (Fig. 3 (*a* and *b*)). They show the joint in active flexion and extension. In Fig. 4 (*a* and *b*) the patient is performing active flexion and extension. The striking muscular strength of both biceps and triceps is clearly visible on the pictures.

CONCLUSION

In two cases of comminuted fracture of the elbow joint, with resulting ankylosis of the elbow joint and pseudarthrosis of the lower end of the humerus, a nearthrosis was successfully formed out of the pseudarthrosis.

SUMARIO

Dos casos de fractura en pedazos (conminución) en la articulación del codo, resultando en anquilosis de la juntura y seudo-artrosis del extremo inferior del húmero, son presentados.

En ambos casos neartrosis fueron ejecutados con éxito y con deshecho de la suedo-artrosis.

Fig. 4 (*a* and *b*). Patient performing active flexion and extension. (Same case.)

RÉSUMÉ

L'auteur rapporte deux cas de fracture du coude avec braiement. Les deux cas furent suivis d'ankylose du coude et de pseudoarthrose de l'extrémité inférieure de l'humérus. Dans les deux cas, une néarthrose fut crée au siège de la pseudoarthrose.

Выводы

Здесь представлены два случая раздробленнаго перелома локтевого сустава с образованием анкилоза локтя и ложнаго сустава нижняго конца плечевой кости. В обоих случаях новый сустав был успешно образован из ложенаго сустава.

Thoracic Injuries in Combat Zone*

C. M. SHAAR, M.D., F.A.C.S.

CAPTAIN, MEDICAL CORPS, UNITED STATES NAVY

THORACIC injuries which occur in the combat zone may be due to a number of causes: (a) bullets from machine gun, rifle or revolver; (b) fragments and shrapnel from shells (artillery and trench mortars), torpedoes (aerial and marine), bombs, grenades and mines; (c) falls from explosions and direct injury by falling débris; (d) bayonet and knife wounds; (e) blast injuries and immersion blast injuries; (f) recoil of large guns; (g) crushing injuries.

Such thoracic injuries are serious and the mortality is high. In the first World War, examination of the dead on the battlefield showed that approximately 37 per cent had chest wounds (Sauerbruch). The American Expeditionary Force (1917-1918) reported that the incidence of thoracic injuries in front-line hospitals and stations was 5.6 per cent, and the mortality rate of patients admitted with wounds of the thorax was 24 per cent. Eloesser in reviewing injuries of the chest received in the last war stated that the incidence of this type of injury given by the British was 3.8 per cent, the Germans 6.2 per cent and the Russians 7.8 per cent. Early mortality among those that escaped immediate death is estimated between 22 to 25 per cent. This emphasizes the importance of training the medical officers that are to be assigned to sea duty, casualty clearing stations, dressing stations and field hospitals. Intelligent first aid and early treatment while the battle is in progress is necessary to decrease this high rate of mortality. Early evaluation of symptoms and immediate and proper treatment are essential to save life.

Early recognition and evaluation of the extent of the injury depends mainly on a thorough knowledge of the anatomy and physiology of the cardio-respiratory system. Any serious interference with the cardio-respiratory system must be corrected immediately, if possible. Unnecessary delay in treatment may increase shock and hemorrhage. The facilities available on the field of battle in advanced battle stations are limited and thoracotomy cannot be undertaken, not only because of the lack of surgical facilities, but also due to the lack of pressure anesthesia apparatus.

Tracheal intubation anesthesia has reduced mortality of open chest operation, but its use aboard ship in time of battle or on the battlefield is not feasible or practicable. This serious handicap limits the application of surgical principles at a time when surgery is urgently needed.

However, there are many fundamental principles that may be applied in the most advanced battle stations and aboard ship in time of battle that will decrease mortality. The most important indication for immediate treatment in chest injuries is the relief of cardio-respiratory embarrassment. The conditions contributing to cardio-respiratory embarrassment are pneumothorax (the

*Presented at the Fourth International Assembly of the International College of Surgeons held in New York, June, 1943.

sucking wound of open pneumothorax and the closed pressure pneumothorax), hemothorax, hematopneumothorax, mediastinal emphysema, cardiac tamponade, massive collapse of lungs, atelectasis and paradoxical respiration from a crushing injury.

The fundamental principles of treatment of war wounds are applicable to chest wounds as well as elsewhere, namely, the control of hemorrhage, administration of plasma for treatment of shock, morphine to relieve pain and allay apprehension, wound débridement, removal of foreign bodies and implantation of sulfanilamide in the wound as well as parenteral administration of the drug to control infection. Eloesser states that local treatment in injuries of the chest may take precedence over general treatment because the functions of the heart and lungs are so vital that their disturbance may in themselves be the cause of shock.

CLASSIFICATION

Thoracic injuries may be classified into three groups: The first consists of the severe type of injury that causes immediate or early death. It is the result of extensive wounds of lungs and heart, wounds of large vessels, severe crushing of chest wall and severe blast injuries. The mortality in this group is extremely high and few reach first aid stations alive. The second group consists of less severe cases and may be saved by early adequate treatment, early transportation and definitive treatment at a later date. The simple methods may not be adequate and radical procedures may have to be employed. It is in this group that ability and judgment may save many. The third group consists of cases that suffer from injuries that are not severe, and recovery may take place in spite of lack of treatment or delay in treatment. In such cases, the simplest procedure is usually sufficient to meet the necessary requirements.

TREATMENT

Open pneumothorax (sucking wounds) causes: (1) mediastinal flutter with serious circulatory phenomena and diminished cardiac output; (2) "Pendelluft" phenomena (Brauer); see-saw of air between the wounded side and the sound side of the lungs; (3) partial local anoxemia; (4) collapse of one lung with loss of breathing space. Treatment consists of immediate closure of the wound after the above-stated surgical principles have been applied. Closure may be performed by suture, occlusive dressings, adhesive plaster, etc.

Closed pneumothorax (pressure or tension pneumothorax) is caused by injury to lung or bronchi or a cutaneopleural fistula which permits the air to enter the pleural cavity, but impedes its escape. This condition is more serious on the right side because the right heart and great veins are more sensitive. Treatment: Aspiration of air by any available method will give temporary relief in an emergency.

Hemothorax and hematopneumothorax are often present together. Hemorrhage from wounds of the large vessels of the hilus are usually fatal. Lung hemorrhage may stop spontaneously due to low pressure in pulmonary arteries. Hemoptysis is usually present. Injuries of the internal mammary artery may result in serious hemorrhage and ligation of the vessel is indicated to prevent fatality. Hemorrhage from the intercostal vessels is often persistent but rarely fatal. Exposure and ligation of vessels are necessary. If bleeding from laceration of the lung persists, suture, lobectomy or even pneumonectomy may be advisable. Massive bloody effusion requires slow aspira-

tion. The quantity of blood removed should be replaced by an equal amount of air to prevent rapid expansion of the lung and produce recurrence of hemorrhage. If the fluid level does not reach above the nipple and there are no signs of cardio-respiratory disturbance, it is best not to asperate but observe for several days.

Mediastinal emphysema is the result of a tear in the bronchi or trachea from a wound or crushing injury. It is rarely caused by a rupture of the lung. Air escapes to the mediastinum and later makes its appearance in the suprasternal notch. Its crepitation is synchronous with the heart beat. It is a much more serious complication than subcutaneous emphysema which starts in the vicinity of a lung injury and may spread over a large area. If mediastinal emphysema causes cardio-respiratory disturbance, incision should be made in the suprasternal notch and blunt dissection with the finger is carried downward until pressure is relieved.

Cardiac injuries are usually fatal. If the patient survives and circumstances permit, operation to suture the knife or bullet wound may save life. If the symptoms of cardiac tamponade are not serious, slow and partial aspiration may be performed after several hours have elapsed. This may be sufficient to relieve tension within the pericardial sac. The symptoms of cardiac tamponade are low blood pressure, faint heart sounds, thready pulse, cyanosis and engorgement of veins of neck.

Injuries to the chest wall are the result of contusions, lacerations and fractures. The most serious of chest wall injuries are those caused by crushing injuries or recoil of large guns. If the injury is very severe, the mortality is high. Flail chest with multiple fractures of many ribs, damage to thoracic wall and paradoxical respiration impairs the intake of air. The following findings are characteristic—marked dyspnea, crushed side of chest sinks in on inspiration, breathing is mainly abdominal, paradoxical motion is increased and respiratory embarrassment becomes severe. Treatment consists of controlling hemorrhage if present and stabilizing the chest wall by applying clips to ribs and secured to overhead frame. Sand bags to chest or small respirator may be used.

Atelectasis and massive collapse of lungs are not infrequent complications in thoracic injuries. The presence of foreign bodies in the bronchi must be kept in mind, and if circumstances permit, bronchoscopy should be undertaken.

Esophageal and thoracic duct injuries are rare. Esophageal injuries also carry a high mortality (70 per cent) as a result of mediastinitis. Immediate operation is indicated to repair esophageal wounds and drain the mediastinum. In cases of injury to the thoracic duct, repair of the laceration or ligation of the severed ends are indicated.

In abdominothoracic injuries, except for arrest of hemorrhage and closure of sucking chest wounds, abdominal injuries demand precedence in surgical treatment.

Contusion of the lungs, traumatic asphyxia, subcutaneous emphysema, and blast injuries seldom require surgical intervention. Conservative treatment is usually sufficient: rest, sedatives, perhaps oxygen inhalation and treatment of shock if present. Blast injuries are the result of detonation of high explosives and cause sudden compression of chest by exploding gases. It is a pressure wave of high velocity and short duration (0.006 second) which is followed by a longer wave of negative pressure (0.03 second). The critical distance from the center of the detonation of high explosive in the air is about 20 feet. The critical distance is increased about four

times if the explosion is under water. Atmospheric blast injuries chiefly affect the lungs; immersion blast injuries, the abdominal structures, with secondary effects in the bases of both lungs and central nervous system. Severity of the injury depends on the severity of the high explosive, the distance from the center of detonation and the position of the individual in relation to that center. If the individual is near the critical distance, sudden death takes place without evidence of external injury. If the patient survives, the symptoms are often severe — profound shock, hemoptysis, dyspnea, air hunger, cyanosis, frothy bloody sputum and not rarely traumatic asphyxia. Conservative treatment is advisable—absolute rest, oxygen, plasma and sedatives in moderation.

Physical prophylaxis in the form of light armor or plastic material as a protection against abdominal and thoracic injuries may be useful. At present, considerable interest and study are being applied in that field for the improvement and advancement of this type of prophylaxis. The use of steel helmet by the French Army in the last war reduced the incidence of cranial wounds from 15 to 3 per cent.

Admiral Chambers of the Medical Corps, after a recent inspection of the hospitals in the Pacific area, stated that the mortality rate among the wounded naval and marine personnel was approximately 1.5 per cent. The most important new factors in markedly decreasing mortality in this war are plasma to combat shock, sulfa drugs to combat infection and air transportation of the seriously wounded from the battlefield to base hospitals. Severe thoracic injuries and head injuries if transported at high altitude do very poorly, due to disturbances of the cardio-respiratory system. This is especially true of closed pneumothorax. The expansion of air in the pleura at high altitude may cause death from mediastinal shift and anoxemia. Thoracic and head injuries and patients anemic from loss of blood should not be transported by air at altitudes higher than 4000 feet.

Complications and late treatment are not within the scope of this brief discussion.

SUMMARY

Thoracic injuries to American troops in combat zones during the first World War numbered 5.6 per cent of all wounded. Mortality among patients with wounds of the thorax admitted to front-line hospitals was 24 per cent. First aid and early treatment, which depend on a thorough knowledge of anatomy, are the two most important factors in decreasing mortality. Delay increases shock and hemorrhage. Prompt measures to relieve cardio-respiratory embarrassment are essential. In case of abdomino-thoracic injuries, abdominal injuries should be given precedence.*

SUMARIO

Daños-torácicos entre las tropas americanas en las zonas de combate durante la Primera Guerra del Mundo, numeraron un 5.6 por ciento de todos los heridos.

La mortalidad entre los pacientes con heridas torácicas admitidos a los hospitales de linea frente, fueron de 24 por ciento. Primeros auxilios y tratamiento temprano, que requieren un conocimiento competente de anatomía, constituyen los dos más importantes factores en la reducción de la mortalidad.

Dilación augmenta el choque y la hemorragia. Prontas medidas para remediar impedimentos cardio-respiratorios son esenciales. En casos de daño

*The opinions or assertions contained herein are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

o lesiones abdomino-torácicas, las lesiones abdominales deben recibir prioridad en tratamiento.

RÉSUMÉ

Dans la première guerre mondiale les lésions thoraciques des troupes américaines représentaient 5.6 pour cent de toutes les plaies. La mortalité de ces blessés thoraciques admis aux hôpitaux de première ligne fut de 24 pour cent. Les facteurs les plus importants pour abaisser cette mortalité sont: (1) traitement précoce de ces plaies; (2) connaissance complète de l'anatomie de la région thoracique, externe et interne. Tout retard aggrave le choc et l'hémorrhagie. Il faut agir promptement, car il est essentiel de soulage l'embarras cardio-respiratoire. Dans les cas de blessures abdomino-thoraciques, il faut donner la précédence aux lésions abdominales.

Выводы

Грудные поражения среди американских войск в зоне сражения в Первой Всемирной войне составляют 5.6 процента всех раненых. Смертность среди пациентов с грудными ранами, которые были приняты в фронтовые лазареты, была 24 процента.

Два главных фактора в понижении смертности являются первая помощь и немедленное лечение. Задержка увеличивает шок и кровотечение. Очень важно принять быстрые мери к облегчению сердечно-дыхательных трудностей. В случаях брюшно-грудных поражений, брюшное поражение считается более важным.

GUILLAUME DUPUYTREN

(Continued from page 354)

ing the dates of his own work. Laennec showed his intellectual integrity on this occasion by rising in the Medical School Society and exposing Dupuytren. As a result of the affair, pathology suffered for a time, since both Dupuytren and Laennec abandoned the field.

In 1808 Dupuytren was appointed adjunct-surgeon at the Hôtel Dieu, a position which gave him power and opportunities beyond his dreams. These were enhanced by his marriage in 1810 with Mlle. Sainte-Olive, who brought with her a dowry of 80,000 francs. Let it be noted that his lack of concern for ethics was carried over into private life. Already engaged to the daughter of Alexis Boyer, whose dowry was a mere 50,000 francs, our rising surgeon wrote to Boyer, whose fame was eclipsed only by Larrey and Dupuytren, cancelling the contract drawn up between them at the time of the engagement.

After the death of Sabatier, in 1812 Dupuytren received the chair of Operative Surgery at the Hôtel Dieu, although it seems that the examination was not unprejudiced—three of the five judges retiring and leaving two to render the decision in Dupuytren's favor.

During the siege of Paris in 1814 Dupuytren again had experience in war surgery, although these brief experiences caused Larrey amusement when Dupuytren mentioned war surgery.

In 1814 Dupuytren became Surgeon-in-Chief at the Hôtel Dieu, where he reigned supreme until his death, the master, almost the dictator of French surgery.

At the Hôtel Dieu he personally watched over 113 beds, doing all minor operations and dressings. He was a tireless worker, possessing astounding energy, as his daily routine proves. From 6 to 11 A.M. he worked at the

(Continued on page 380)

Army Rehabilitation*

LT. COL. CORNELIUS E. GORMAN, M.C.
SURGEON-GENERAL'S OFFICE—ARMY OF THE UNITED STATES
WASHINGTON, D. C.

THE training battalions of today are essentially the same as of yesteryear—when we fought "to save the world for democracy." The ones today, we hope, have profited by the experience of those pioneers which set up the training battalions during World War I. They are based upon two main factors and are composed of two principal groups: namely, those who are handicapped physically and those handicapped mentally. The latter group, of course, is divided into those who are retarded by reason of actual mental underdevelopment, and those who are retarded because they have never had the opportunities offered to most of us today. It is indeed by far the hardest to obtain any useful results from the former. The latter having inherent natural mental resources, and much of the so-called "common sense," are easy to teach and they respond with exceptional rapidity. From this type of individual there is a very high percentage of salvage.

The Developmental Battalions of World War I were authorized on May 9, 1918, by the War Department, which provided for the formation of one or more development battalions in all large camps and cantonments. The division of physical reconstruction of the Surgeon-General's Office made a series of studies for the purpose of determining positions where soldiers with slight physical handicaps might be assigned to limited service duty. This was done with a view of freeing able-bodied men for full combatant duty. On September 9 the activities of development battalions, insofar as they related to the Surgeon-General's Office, were placed under the direction of the division of sanitation. There was established a group of medical inspector-instructors who traveled from camp to camp in order to put into effect uniform methods of organizing and administering the developmental work in these battalions. Twenty-seven camps were thus visited. Through the aid of these instructors, and of the circulars of instructions issued by the committee on development battalions, about fifteen camps evolved very efficient systems of training in their development battalions before the signing of the Armistice put a stop to the work. In these camps the men were rapidly classified and either promptly discharged as unfit for any military service or given courses in physical development. These courses were under the supervision of medical officers, with a view to putting them in better condition to perform certain military functions. Soldiers with venereal disease were kept in special companies in the development battalion and given intensive treatment until cured or found to be incurable. Colonel H. D. Corbusier, who was the medical officer in charge of this rehabilitation work at Camp Greenleaf, North Carolina, is to be commended for the excellent services he rendered in this work.

It will be noted that the development battalion of the first World War had 34.4

* Presented at the Fourth International Assembly of the International College of Surgeons, New York, June, 1943.

per cent venereal cases. During the present conflict, venereal patients are all being handled under a special policy. There is at least one venereal disease facility centrally located in each service command. Uncomplicated gonorrhea and syphilis are receiving scientific and well-planned therapy. This is all directed from the venereal disease control section of the Surgeon General's Office.

Treatment has been responsible for the reclamation of over 90 per cent of gonorrhea cases and 100 per cent of the luetics. This latter, of course, after the cerebrospinal and complicated syphilitics have been separated from the service.

With a rapid mobilization of the Army, a number of individuals from the so-called under-privileged class and the physically defective were infiltrating into the Army. This necessitated that the War Department establish a testing ground for these handicapped individuals. The place was at the Branch Immaterial Replacement Training Center, Fort McClellan, Alabama. The representatives of the various branches were chosen as follows: Lieut. Col. Wm. L. Roach, Classification Section of the Adjutant General's Office, Lieut. Col. Barney Daughtry, representing the Infantry, and myself representing the Surgeon-General.

The experimental battalion had as its main objective to improve the status of the sub-standard, or those temporarily unfit, to determine how many could be reclassified. This objective was to be reached primarily by training methods and secondarily by medical or surgical procedures; the latter to be used only in cases proved to be beneficial to the government. From that original experiment we reclaimed 10 per cent. These were to be reclassified to general military service. The others we are certain were improved physically about 75 per cent and were made better soldiers by reason of their rehabilitation.

The period allotted to us to make men out of misfits was eight weeks. The plan of training was based on progression. This was to enable the largest number to gain self-confidence and thus endure more and more strenuous work as the training proceeded. Our intimate association with these physical defectives soon taught us what proved to be the greatest lessons we could learn: *First,* a very high percentage afflicted with physical defects are willing and anxious to help themselves. *Second,* nearly all were very low in self-confidence. *Third,* the lack of self-confidence was caused by self-pity. *Fourth,* there existed a peculiar indefinable condition best described as a mixture of psychoneurosis and hypochondriasis.

In planning our attack we made our first and heaviest wedge the development of self-confidence. This was accomplished by progression. If these men had been pushed in the beginning, I believe they would have failed. However, with kindness, insistence and a combination which I believe to be excellent—the line officer, the personnel consultant, and the medical officers—a large percentage developed splendidly.

One of the best technics for improving the body is physical education. Abraham Lincoln must have had some such idea in mind when he stated "I don't know who my grandfather was; I am much more concerned to know what his grandson will be." Yes, we should make and keep ourselves and the children of this democracy in perfect physical fitness —we should outmaster the "master race."

Precision drills or exercises develop coördination of mind and muscle. This coördination coupled with an acquired stamina is a chain that lacks only one link —mentality—a sound body certainly aids in developing mentality. The proper ex-

ercises, carefully supervised can really work miracles. After approximately six weeks of training the under- and overweights were segregated. A special routine was established for them. The weight loss of those with excess weight was appreciable. However, the weight gain of the underweight was astounding! They gained 5.58 lbs. per man over a two-week period. Their weight gain over the first six weeks was 2.62 lbs. per man. The only medication they received was one tablet of iron, quinine and strychnine, three times daily. We felt that this feat of weight gaining was worthy of particular note.

Nearly every man in the development battalion gained in physical prowess. Each was measured, weighed and given physical tests at the onset and again at the termination of the training period. Our password to the "trainasium" commonly referred to as the "torture chamber" was *P E P*—Posture Expresses Personality. I have singled out the case that showed the greatest improvement as an example, although I can truthfully say that over 95 per cent showed remarkable progress in physical development. All of the apparatus was made from salvaged material (See Chart 1).

CHART 1.

PHYSICAL MEASUREMENT AND ATHLETIC ACHIEVEMENT CHART

Age: 35 Name: K. W. W.

Awarded trophy for showing most improvement.

Date: 7 July 1942		1 September 1942
Stripped weight:	148½	158½
Neck (normal)	13¾	15
Chest (deflated)	33½	37½
Chest (normal)	34¾	38¾
Chest (inflated)	37	40¾
Bicep (R. flexed)	12	13
Bicep (L. flexed)	11½	12½
Waist (normal)	28½	32
Hips (normal)	35	36
Thigh (R. flexed)	18¼	21¾
Thigh (L. flexed)	18¼	21¾
Posture	Fair	Good
Total inches Plus or minus		Plus 25 inches

ATHLETIC TESTS

Date: 12 July 1942		3 September 1942
1. Push-ups	9	15
2. Chinning	6	9
3. Standing broad jump	6′9″	6′11″
4. Spring, 50 yds.	8 seconds	7.6 seconds

One very important phase of the work in these developmental battalions is the rôle played by the classification consultant. However, I would like to state a few things concerning the mental development. Many of those inducted into the Army would have been acceptable military material in Civil War days; however, today they do not fit into the specialized mechanized fighting machine. They must first learn to read and absorb print. Some have very vague ideas of current events. One man stated he was confused—he had heard that the Kaiser was hung in 1918—now everyone was saying that Kaiser was building ships for Uncle Sam! Another, when asked the name of the President of the United States, parried with, "Would it be Gene Talmadge?"

Through the courtesy of Colonel Roach and Colonel Johannes of the Training Centers at Fort McClellan and Camp McCoy respectively, I have obtained the latest available figures referable to the rehabilitation and reclassification of their trainees. Fort McClellan is salvaging approximately 5 per cent and Camp McCoy 6 per cent. These are being reclassified 1-A. The figures regarding the under- and over-weights received from Fort McClellan are quite interesting. Twenty-five per cent correction was achieved on the underweights with a gain of 6.9 lbs. per man. Twenty-nine per cent

of those overweight were reduced. They lost an average of 15.2 lbs. per man.

Realizing the debt that the people of this country owe the soldier, the Army is attempting to repay as much as is humanly possible through the facilities of the Medical Department. The policy of the Medical Department is to never let it be said, when referring to medical service, "Too little and too late." With that view in mind, the Army has established special treatment centers. These are located in general hospitals strategically situated at convenient and easily accessible locations over the country. These centers have been named and are located as follows (See Chart 2):

CHART 2.

GENERAL HOSPITALS DESIGNATED FOR THE SPECIALIZED TREATMENT INDICATED:

a. Chest surgery

Fitzsimons	Denver, Colorado
Hammond	Modesto, California
Kennedy	Memphis, Tenn.
Walter Reed	Washington, D. C.
Brooke	San Antonio, Texas

b. Maxillofacial, plastic and ophthalmic surgery

Bushnell	Brigham, Utah
O'Reilly	Springfield, Mo.
Valley Forge	Phoenixville, Pa.
Walter Reed	Washington, D. C.
Letterman	San Francisco, California

c. Blinded casualties

Letterman	San Francisco, California
Valley Forge	Phoenixville, Pa.

d. Impaired hearing. Defective hearing of a degree which precludes the return of a patient to duty.

Walter Reed	Washington, D. C.
Hoff	Santa Barbara, California
Borden	Chickasha, Oklahoma

e. Amputation centers

Bushnell	Brigham, Utah
Lawson	Atlanta, Ga.
McCloskey	Temple, Texas
Percy Jones	Battle Creek, Mich.
Walter Reed	Washington, D. C.

f. Neurosurgery

Ashford	White Sulphur Springs, W. Va.
Brooke	San Antonio, Texas
Bushnell	Brigham, Utah
Fitzsimons	Denver, Colo.
Hoff	Santa Barbara, California
Kennedy	Memphis, Tenn.
Lawson	Atlanta, Ga.
Lovell	Fort Devens, Mass.
McCaw	Walla Walla, Wash.
McCloskey	Temple, Texas
Nichols	Louisville, Ky.
O'Reilly	Springfield, Mo.
Percy Jones	Battle Creek, Mich.
Schick	Clinton, Iowa
Tilton	Fort Dix, N. J.
Walter Reed	Washington, D. C.

g. Vascular surgery. Major vascular injuries and their sequelae such as arterio-venous fistulae, aneurysms and peripheral vascular disturbances such as chronic vasospastic conditions, those resulting from frost-bite, immersion foot, and other conditions producing peripheral circulatory deficiency states; but not including minor disturbances such as varicose veins:

Letterman	San Francisco, California
Ashford	White Sulphur Springs, W. Va.

These general hospitals have been especially equipped for specialized treatment in addition to their regular work. Probably more important than instruments is the man to use them. With that thought in mind some of the best in the profession have been obtained to supervise, direct and participate in this all-important work. I am sure that their names are familiar to all. There are such men as Bryan Blades, formerly Secretary of the American Association of Thoracic Surgery; Glen Spurling, formerly Secretary of the Board of Neurologic Surgery; Van Wagenan, formerly Professor of Neurosurgery at Rochester University; George Baker, neurosurgeon of Mayo Clinic. These are only a few—there are many others whom I am sure

all of you know. In practically all of these centers the staffs are composed of national or even international figures in surgery. This all-important work is under the direction of members of the Medical Practice Division of the Surgeon General's Office. This division is being expertly handled with the utopian mixture of a high professional standard intermingled with a benevolent human understanding, under the direction of Col. Arden Freer.

The chiefs of the centers are not denied anything in the way of equipment. Their wish is law and one will find the best instruments and equipment in their hospitals. In order to obtain the best end results, conferences have been held in which the chiefs of a particular type of center met. Here they exchanged ideas hoping to take the best from all. This enabled them to standardize treatment insofar as is practicable.

In addition to the special professional personnel there has been obtained many who have special qualifications such as physiotherapists, etc. These are qualified experts in their profession—365 of these have been commissioned in the Army of the United States. In addition, especially qualified personnel have been hired to teach the deaf, the mute and the blind. In the treatment of the blind, it is important to establish a favorable state of mind. This type of casualty suffers an emotional shock that requires a very delicate psychological approach. A contact man, usually one blinded in the service, is used to encourage the newly blinded. This method does a great deal toward rehabilitating the blind and showing them that they have a valuable and interesting life ahead of them. Instructors experienced in work with the blind, especially technics such as Braille, have been obtained. This, of course, in addition to the diversional, recreational, and occupational therapy.

An individual losing his hearing also suffers quite a shock. Hearing aids will be furnished to those who have lost their hearing in line of duty. Instructors in lip reading are on the educational staff of these centers.

The adjustment of the soldier who has had an amputation is quite a serious problem. A temporary prosthesis is furnished and the soldier is taught to dress, to write, and to properly care for himself.

The orthopedic cases present a large group of patients for physiotherapy and occupational therapy. The physiotherapy includes baking, massage, whirlpool and exercise. Closely allied to physiotherapy is occupational therapy. Interesting creative occupations accomplishing the desired function may be carried on for lengthy periods—the patient virtually treating himself.

The actions or motions of the patient are actually medically prescribed. If a wrist is involved and it is desired that the patient should keep it in motion, an occupation requiring wrist movement is assigned as a medical prescription. There are many useful jobs that can be done and at the same time satisfy the necessary medical requirement of using the limb or joint. Such things as a foot-driven printing press, or a six-pedal loom for weaving, or a Potter's wheel—if possible, the production of something useful and the satisfying of the individual's hobby is the ideal to be sought.

Occupational therapy is very beneficial when directed toward the nervous and mental patient. If you leave this type of patient alone he spends all of his time feeling sorry for himself or dwelling on morbid ideas. An attempt should be made to adjust the job to his personality —make him a part of an operation which involves several people. Complex wood working is excellent. Such productiveness and association with other people prevents further mental disintegration.

Special rehabilitation problems confront the occupational therapist in teaching the blind. By progression and consideration they are taught to use a hammer, screw driver, saw, etc. The production of some useful article gives them an assurance that he can master an environment which is now strange because of the lack of sight. Special services are being made available which are equivalent to college and high school classes plus language courses which are taught by text and records. Educational movies are becoming very beneficial in this program for general education.

Nothing has been left undone in reference to the physical plant. An excellent example is the Forest Glen Annex of Walter Reed General Hospital. The convalescent soldiers call it "Holiday Inn." One of the beauties of this place is the main ballroom containing double-tierred balconies from which the less active men have a point of vantage to observe the games and other diversions that are planned for the men. Also looking down from niches under the great oak-beamed roof are some examples of the endless variety of statuary that did cast a cultural aura over the place when it was the National Park College, with its spacious and cultured 182 acres.

Needless to say that many of you noticed the preponderance of neurosurgical centers. These are staffed with highly trained neurosurgeons. The reason for such a preponderance of neurosurgical centers, as compared to the other specialties, is largely due to our anticipation of a great number of peripheral nerve injuries. Statistics of warfare show that 65 per cent of all casualties have injuries of the extremities. Approximately 25 per cent of these casualties will have nerve injuries of varying degrees. Therefore, this is considered a very important phase of rehabilitation and one in which excellent end results are anticipated. In addition to these anticipated casualties, there are a great number of neurosurgical problems such as nucleus pulposus, skull fractures, etc., presenting themselves daily in each service command.

CONCLUSIONS

1. Surgical rehabilitation of defects existing prior to induction should not be done by the Army in order that the man can be brought into the service.

2. Surgical rehabilitation is being done on men who are within the service when it is deemed necessary for the good of the patient.

3. Specialized training is necessary to rehabilitate the majority of individuals who have physical defects.

4. The team necessary to obtain the best results is a line officer, a personnel consultant and a medical officer.

5. The country owes the casualty a debt, and it is being paid in part through the activities of the Surgeon-General's Office in rehabilitating the wounded.

6. Specialists trained in rehabilitation, physiotherapy and occupational therapy are necessary to form an efficient rehabilitation team.

SUMARIO

La rehabilitación de las fuerzas armadas es discutida con las conclusiones siguientes:

1. Rehabilitación chirúrgica de los defectos existentes antes de la inducción militar no deberá ser efectuada por el servicio médico-miltar a fin de atraer el individuo el servicio.

2. Rehabilitación-chirúrgica es practicada dentro del servicio militar cuando se juzga necesario para el bienestar del paciente.

3. Especializada experiencia es necesario a fin de rehabilitar la mayor parte de los individuos con defectos físicos.

4. La mejor organización para obtener los mejores resultados consiste de: (a) un oficial de linea, (b) un personnel consultante y (c) un oficial médico.

5. La nación debe a los dañados una deuda que se está pagando en parte por medio las actividades de la oficina del Cirujano General en la rehabilitación de los heridos.

6. Especialistas instruídos en rehabilitación, fisioterapéutica y la terapéutica de empleo, son necesarias para la organización de un grupo eficiente de rehabilitación.

RÉSUMÉ

La réhabilitation des blessés est étudiée et les conclusions suivantes sont avancées: (1) La réhabilitation chirurgicale des conditions antérieures à l'enrôlement ne doit pas être entreprise par le corps médical de l'armée, afin d'apprêter la recrue pour le service. (2) La réhabilitation des hommes dans le service sera faite quand cela paraîtra nécessaire, pour le bien de l'individu. (3) Pour rémédier aux défauts physiques, il est essential que le malade soit sous les soins de chirurgiens et de médecins ayant subi un entraînement spécial. (4) L'équipe nécessaire pour obtenir les meilleurs résultats sera composée d'un officer, d'un consultant et d'un médicin militaire. (5) Le pays a une dette envers les blessés de guerre, et cette dette est payée en partie par les activités du *Surgeon-General's Office* pour le rehabilitation des blessés de guerre. (6). Il est nécessaire, il est essentiel de former des équipes composées de spécialistes entraînés spécialement pour la réhabilitation, de spécialistes en réhabilitation, en physiothérapie et en thérapie occupationnelle.

Выводы

Рассматривая вопрос военной реабилитации автор приходит к следующим заключениям:

1. В хирургической реконструкции недостатков, существовавших до призыва в армию, нельзя руководится только нуждами военной службы.

2. В хирургической реабилитации солдат на действительной службе необходимо руководиться соображениями направленными только к благу пациента.

3. Для успешной реабилитации большинства людей с физическими недостатками требуется специальная тренировка.

4. Для лучших результатов необходима комиссия состоящая из офицера связи, штатнаго консультанта и военнаго врача.

5. Государство имеет определенный долг по отношению к раненому. Этот долг частью выплачивается через реабилитационную работу Кабинета Главнаго Хирурга Армии (Office of the Surgeon General).

6. Для успешной работы реабилитационнаго состава необходима специальная тренировка в реабилитации и в физической и трудовой терапии.

ACKNOWLEDGMENTS

(Continued from page 352)

dades Tropicales (Mexico, D. F.) Vol. IV, No. 4, Dec., 1943.

Revista Médica (Puebla) Tomo XVII, Nos. 165, 166 and 167, Mar., Apr. and May, 1944.

Revista Médica Veracruzana (Veracruz) Tomo XXIV, No. 5, May, 1944.

Revista Mexicana de Ciencias Médicas (Mexico, D. F.) Año II, No. 5, May, 1944.

Revista Mexicana de Cirugía, Ginecologia y Cancer (Mexico, D. F.) Año XII, No. 3, Mar., 1944.

Revista Mexicana de Tuberculosis (Mexico, D. F.) Tomo VI, No. 28, Jan.-Feb., 1944.

Revista de la Universidad de Puebla (Puebla) Año I, No. 4, Feb., 1944.

Sugestiones (Mexico, D. F.) Año IX, No. 104, Apr., 1944.

Palestine

The Palestine and Near East Medical Journal (Jerusalem) Vol. III, No. 2, Mar.-Apr., 1944.

Peru

Gaceta Peruana de Cirugía y Medicina (Lima) Año V, Nos. 67 and 68, Nov. and Dec., 1943.

(Continued on page 408)

Una Nueva Técnica de Toracoplastia por Via Axilar*

(A New Technic of Thoracoplasty through the Axilla)

MARIO VERGARA SOTO, M.D., M.I.C.S.
MÉXICO, D. F.

SUMMARY

This new technic of thoracoplasty through the axilla has the following advantages: (1) Wide exposition of the operative region, facilitating extension; (2) section of the muscles is reduced to the minimum, so shock is avoided; (3) sectioning of the ribs is facilitated, and (4) the scar is under the arm.

Hace seis años, al principio de los estudios que emprendí en el cadaver sobre cirugía toráxica; y estudiando con el maestro Don Darío Fernández los distintos procedimientos de torocoplastía propuestos para el tratamiento de la tuberculosis pulmonar y de los piotorax crónicos, el ideó una nueva técnica, por vía axilar, que trató de corregir las desventajas de orden técnico quirúrgico que pueda imputarse a las distintas vías de acceso a la planilla costal, inclusiva la de orden estético.

Hoy, después de haberla usado en varios años en que ha sufrido los retoques que las necesidades de la prática han impuesto, hago su publicación con autorización del Maestro Fernández, convencido de las enormes ventajas que en ella concurren.

El procedimiento operatorio lleva como idea fundamental la de exponer ampliamente la región operatoria, levantando todo aquello que a modo de tapa, cubre la porción torácica superior y hace poco accesible la primera costilla, que forma con el omoplato, la clavícula y la articulación del hombro, la clave de cualquier toracoplastía en el tumerculoso pulmonar.

La sección muscular, ampliamente compensada por la soberbia exposición, queda reducida al mínimo, lo cual es un factor importante para disminuir el choque y para conservar la mecánica fisiológica del miembro superior y disminuir la deformacíon post-operatoria.

La primera costilla queda a la vista casi en su totalidad y puede desarticularse desahogadamente como he podido realizarlo en algunos casos, y finalmente todos los peligros quedan por encima de la primera costilla, aislados por el separador; y la cicatriz quirúrgica queda oculta bajo el brazo en su posicíon anatómica.

TÉCNICA

Posición del enfermo.—Posición intermedia entre el decúbito dorsal y lateral, colocando un cojín entre el hemitorax que se apoya en la mesa y esta, con objeto de exponer bien la región en que se va a intervenir. Miembro superior en abducción forzada (que pase de 90°) y semisupinación.

Primer tiempo.—Incisión que, partiendo del surco que forman el borde

* Presented at the Third International Assembly of the International College of Surgeons held in Mexico City.

inferior del pectoral mayor y la porción larga del biceps se dirige hacia abajo y atrás, pasando por la base de la axila para terminar rodeando la punta de la escápula.

Sección de la piel y tejido celular subcutáneo hasta descubrir la porción del biceps y el pectoral, hacia arriba; y hacia abajo la porción larga correspondiente del gran dorsal (Figs. 1 y 2).

Segundo tiempo.—Tomando entre dos pinzas un pliegue de la aponeurosis de la base de la axila, se da un tijeretazo valiente que deje penetrar facilmente al hueco de ésta.

Si se ha encontrado el plano correcto de desplegamiento, con toda facilidad y simplemente con los dedos se despega en todos sentidos y se rechaza hacia la parte superior el contenido vásculo nervioso del hueso axilar (Fig. 3).

Tercer tiempo.—Pequeña sección del gran dorsal bajo el ángulo de la escápula.

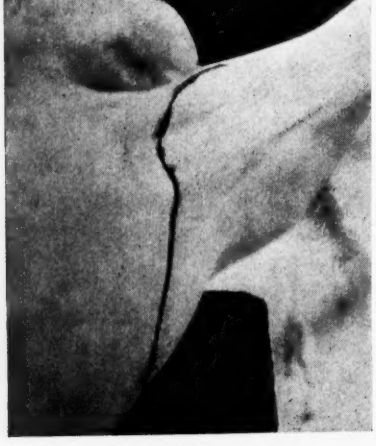
En estas condiciones puede calcularse si con solo ampliar el despejamiento se obtendría luz suficiente, si no es así se expondrá con el separador la cara anterior del pectoral mayor y sin separarse, hacia atrás, de su cara posterior, se secciona este músculo en dirección de la incisión cutánea y en la extensión que se necesite (habitualmente, no más de 2 o 3 centímetros). La dirección de este corte enteramente igual a la que de él hacen Fiolle y Delmas en la ligadura de la subclavia, no hace sufrir ni la inervación ni la nutrición del músculo.

Si durante las maniobras operatorias fuese necesaria una mayor exposición, bastará despegar el plano célulo-cutáneo de las formaciones subyacentes que deban seccionarse, sin cortar aquel (Fig. 4).

Cuarto tiempo.—Se continúa el despegamiento hacia adelante hasta los cartílagos costales desprendiendo las inserciones de ambos pectorales; y hacia atrás, hasta la columna vertebral, seccionando con las tijeras los pequeños nervios perforantes de los intercostales que se presentan.

En este momento cambian la posición del brazo aumentando la abducción y tirando de él hacia arriba; y luxando el omoplato, con unos cuantos cortes de tijera se desprenden las lenguitas del serrato mayor de sus inserciones costales, quedando ampliamente expuesta la región.

Esta última maniobra de cambiar la



Figs. 1 y 2. Trazo de la incisión y sección de la piel y tejido celular subcutáneo.

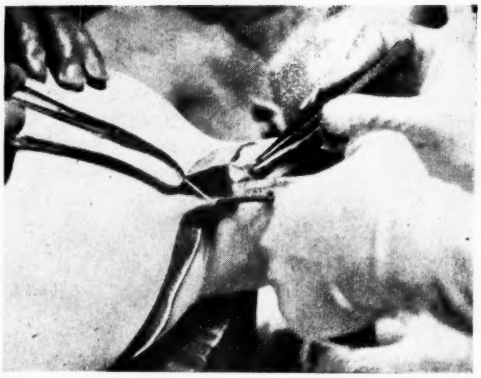


Fig. 3. El pliegue de la aponeurósis que cierra la base de la axila, tomando, entre las dos pinzas, ha sido seccionado y las tijeras, ampliando la brecha, muestran el plano de despegamiento.

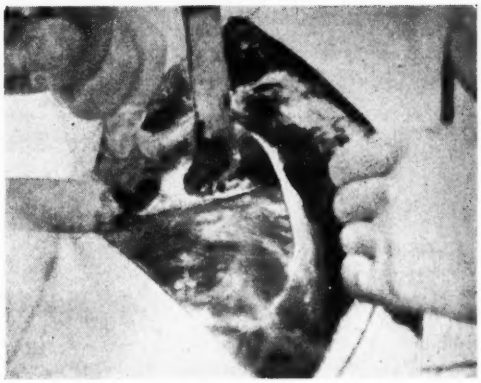


Fig. 4. El pectoral mayor y el gran dorsal separados, y el despegamiento casi completado, exponen ampliamente la región operatoria. El contenido de la axila con el tejido celular de ésta ha sido rechazado hacia arriba con el separador. Con toda claridad se aprecian la primera costilla, el tendón del escaleno anterior insertado sobre ésta, la segunda costilla y, en la porción derecha de la región, descendiendo el nervia del serrato mayor.

posición es tan importante como lo es la mano izquierda del ayudante en la colicistectomía, pues si la posición no es correcta y mantenida no se entrega la región (Fig. 5).

Quinto Tiempo.—Resección costal en el orden que se quiera y en la amplitud del área costal que se necesite. Se puede desarticular la primera costilla en sus dos extremos.

Sexto tiempo.—Terminada la resección costal y asegurada una hemorragia absoluta, se retira el cojín, se abate el brazo y se suturan las pequeñas secciones del pectoral y del gran dorsal. Sutura de piel y tejido celular subcutáneo dejando un tubo de drenaje.

SUMARIO

La nueva técnica de toracoplastia por vía axilar tiene las siguientes ventajas: (1) Una amplia exposición de la región operatorio y facilidad para si fuere necesario ampliar ésta; (2) las secciones de músculos quedan reducidas al mínimo con lo que evite grandemente el shock operatorio; (3) siendo el campo operatorio tan amplio se pueden hacer tantas resecciones de costillas como sea necesario, y (4) la cicatriz operatoria queda oculta bajo el pliegue del brazo.

RÉSUMÉ

Cette nouvelle technique de thoracoplastie par la voie axillaire nous offre les avantages suivants:

1. Une large voie d'accès, permettant,

Fig. 5. La primera y segunda costillas han sido aisladas (subperiósticamente) en su totalidad desde la columna vertebral hasta los cartilagos costales correspondientes, la depresión de la porciones por ellas sostenidas es ostensible.

si la necessité existe, l'extension désirée.

2. La section des muscles est réduite au minimum; le choc est ainsi évité.

3. La section des côtes est facilitée.

4. La cicatrice est sous-jacente au bras.

Выводы

Этот новый способ торако пластики путем подмышки имеет следующие преимущества: 1. Более широкое оперативное поле, 2. минимальное сечение мышц, что уменьшает шок, 3. более легкое рассечение ребр, 4. рубец скрыт под рукой.

GUILLAUME DUPUYTREN

(Continued from page 369)

Hôtel Dieu. Afternoons were given over to private practice and the clinics held several times a week, which were thronged by students and surgeons from all parts of the world. At 6 P.M. Dupuytren again appeared at the Hôtel Dieu, usually spending an hour there. It is a matter of record that this indefatigable surgeon never missed a day in twenty years. In addition he had an immense private practice, said to number 10,000 persons annually.

The position brought with it social standing. In 1816 Louis XVIII created him a baron and honored him with the Order of St. Michael. In 1820 Louis made the noted physician his consulting surgeon. In 1821 Dupuytren became surgeon to Charles X. He was likewise a member of the Academy of Sciences and Royal Academy of Medicine, and in 1824 became president of the latter.

Dupuytren was said to have amassed 4,000,000 francs, a fortune for those days. Let it at least not be said he was ungrateful. It is reported that following the dethronement of Charles X he offered to divide his fortune with the fallen monarch, who refused the 1,000,000 francs Dupuytren so loyally offered.

In 1833 on his way to the Hôtel Dieu he was stricken with apoplexy, but managed to get there and finish his lecture. It was soon discovered that he had a pleural effusion, but embittered and cynical, when urged twelve days before his death to try the benefits of thoracotomy, he refused. He died Feb. 8, 1835.

Dupuytren left his daughter, the Countess of Beaumont, 1,000,000 francs, and 200,000 francs were left to the Faculty of Medicine. This fund was used to found the Dupuytren Museum of Anatomy, housing his own personal collection.

Dupuytren the virtual dictator of French medicine and Dupuytren the man do not present us with an overly attractive portrait. This talented surgeon was an unsociable companion with overbearing manners. He simply did not know that he had a rival in France, his vindictive hatred of such men as Duméril and Velpeau causing him to persecute them. Jealous of others, he made mistakes he was eager to conceal. When mistakes did occur, however, he never lost his composure. Possessed of singular foresight, he had a clear mind and insatiable curiosity. He took a fiendish joy in finding fault with subordinates. He was not above lying and falsifying hospital records. Although very wealthy and meticulous in dress, he lived like a bourgeois.

It was at the bedside and in the amphitheater where Dupuytren shone. A shrewd diagnostician, he used all five senses to make a rapid but thorough examination. In his time anesthesia was unknown, so he had to be rapid, dexterous and agile. Because his talents out-

(Continued on page 408)

Abnormalities of the Female Genitalia

LT. COMDR. MORRIS WEINTROB (MC) USNR*
BROOKLYN, NEW YORK

THE purpose of this paper is to demonstrate the value of a proper understanding of the various abnormalities of the female genitalia, its practical application in the practice of obstetrics and gynecology, and to warn against unnecessary sterilization of women who may possess certain such abnormalities.

That a word of caution concerning the latter procedure is indicated was keenly impressed upon the writer's mind one morning when, after wandering into the operating room to see what there was of interest, he was deeply shocked when shown a "beautiful specimen of a didelphic uterus." That "beautiful specimen" had just been removed by the surgeon. The patient was a young married woman in her early thirties who had submitted to an operation in order to "have something done so that she might be able to have babies."

*The opinions or assertions contained herein are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

THE MÜLLERIAN DUCTS

To understand the manner in which abnormalities of the female genitalia develop, it is necessary to review briefly the embryology of the Müllerian ducts. Incomplete fusion of these ducts throughout the entire length of their canals or the rudimentary development of one of the ducts or any permutations of these "accidents" in development lead to almost all the abnormalities encountered.

Separate Müllerian ducts persist in all vertebrates below the level of *Marsupials*. These open into a permanent cloaca. In mammals fusion takes place in varying degree at the distal end. In primates complete caudal union gives rise to the normal uterus.

A groove in the thickened epithelium

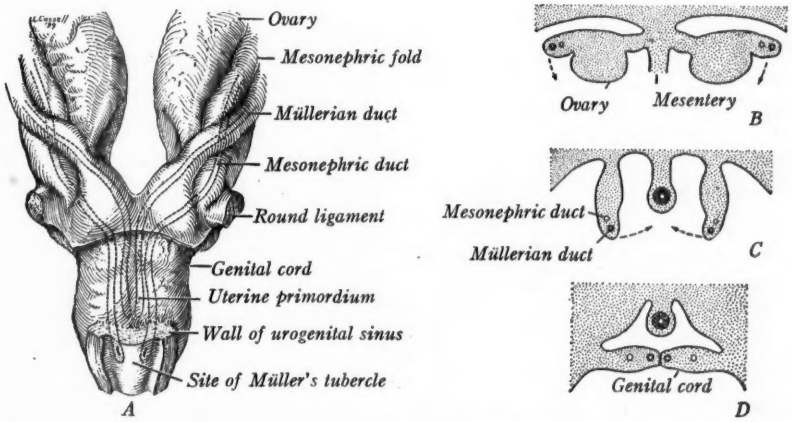


Fig. 1. Course of urogenital ducts and formation of the genital cord (A). Model at two months (X25).

of each urogenital ridge as observed in the human embryo of 10 mm. is the forerunner of the Müllerian ducts.

This furrow is located near the cephalic pole on the lateral aspect of the mesonephros. It remains open at its extreme cranial end. More caudally, the lips of the groove close to form a tube. Thus, it begins as an epithelial inrolling, the solid blind distal end growing progressively in a caudal direction.

After entering the genital cord, the ducts fuse in the embryo at about nine weeks, terminating blindly at Müller's tubercle. A pair of female ducts develop in both sexes. At ten weeks, however, the genital duct of the opposite sex begins to degenerate.

Due to a crowding of the urogenital ridges toward the lateral aspect of the genital cord, the result of the enlargement of the developing suprarenal glands and permanent kidneys, the Müllerian ducts tend to bend at two distinct levels. This gives rise to three regions.

The unfused cranial (or longitudinal) portion of each duct develops into a Fallopian tube. The middle (or transverse) portion is the forerunner of the uterine fundus. In primates this portion normally is completely fused. The cervix arises from the distal longitudinal end. At sixteen weeks the uterus, cervix and vagina are recognizable as such.

At one time it was believed that the vagina originated from the most distal part of the fused Müllerian ducts. Most contemporary embryologists, however, are of the opinion that it develops from the entodermal epithelium of the urogenital sinus that invades the lowest level of the genital cord. This entodermal epithelium replaces the Müllerian epithelium wholly or in part.

The hymen arises at the site of Müller's tubercle from a disc of connective tissue derived from the mesenchyme of the genital cord. In due time it is covered on both sides by sinus epithelium and demarcates the vagina from the urogenital sinus. Usually, though not always, it becomes a perforate membrane.

Despite the fact that the greatest developmental changes in men and mammals take place while the embryo or fetus is still within the uterus, development continues even after birth. According to Arey[3] "only at about the age of 25 are the last of progressive developmental changes complete. Whereupon, the individual actually becomes adult."

COMPARATIVE ANATOMY (AFTER AREY)

Anomaly	*Usually Found in*	*Caused by*
Complete duplication of uterus and vagina	Monotremes and lower marsupials	Total failure of Müllerian duct fusion
Duplication of uterus but not the vagina	Most rodents	Arrest of uterine fusion

Fig. 2. Diagrams illustrating the further history of the fused Müllerian ducts within the genital cord.

Bipartite uterus	Carnivores and ruminants	Uterine primordia merge at lower ends, more or less separated by a median partition.
Bicornuate uterus	Sheep	Imperfect absorption of fundic segments leaving paired pouches at upper uterine ends.

Some of the rarer forms, such as the retention of the fetal or infantile condition, congenital absence of one or both tubes, of one uterine horn, of the uterus or of the vagina or of both may be associated with hermaphroditism of the external genitalia.

Gould and Pyle[35] cite a case of Brodhurst's wherein a girl developed signs of approaching puberty at the age of 4. The mons veneris became covered with hair. At 10 the clitoris was 3 in. long and 2 in. in circumference. This "girl," when 18, had well-developed mammae, "her" labiae descended laterally and expanded into folds resembling a scrotum. There was neither a uterus nor a vagina —a typical example of hermaphroditism.

Stalked or sessile vesicles (hydatids) on or near the osteal end of the tubes are common. Accessory Müllerian funnels, if retained and undergoing cystic change, produce one sessile type of hydatid.

DOUBLE UTERUS

This abnormality has been reported frequently.[93] Bicornuate, bipartite, duplex and double uteri are classified according to the extent of duplication. The varieties range from slight variation from the normal to two distinct uteri with separate appendages and double vagina. The didelphic uterus with a divided vagina is actually a duplex uterus or double uterus—each being a unicorn uterus more or less joined to its neighbor. Didelphic uterus associated with longitudinal closure of the vagina has been reported by Adam.[1]

The association of double uterus, double vagina, double ovarian supply and double vulvae has been observed. Wiart and Sureau's[98] case of double uterus was accompanied by a partial double vagina. Hewson's patient,[40] in addition to double uterus and double vagina, had duplication of the pouch of Douglas. The presence of a single cervix with double uterus is not too rare.

Hollander[41] reported a case of double uterus wherein one opened into the vagina and the other into the rectum. Usually, double uteri are situated lateral to each other. Occasionally, one may be anterior to the other and yet both may be served by a common cervix. In one case the anterior uterus had no adnexae but did possess lateral ligaments. This anomalous development may have been the outcome of excessive growth of one of the Müllerian ducts. This gives rise to the folding off of a portion which, in turn, becomes the anterior uterus.

A sufficient number of women with double uteri have been delivered safely of several children. It seems reasonable to conclude, therefore, that surgical removal of either one or both components of a double uterus is *not always* definitely necessary.

Perrigard[63] described a primipara with two distinct vaginae, two separate cervices and apparently two uteri. During the third month of pregnancy, he removed a thick vascular vaginal septum. Parturition continued to term and delivery was uneventful.

SUPERFETATION

There has been much speculation on the possibility of superfetation in women with a double uterus. Debierre's[23] report

of a woman pregnant at the same time in both components of such a uterus is most interesting. One full-term child was born on July 16th and the other full term child on October 31st of the same year. Between each confinement the patient had what appeared to be three normal menstrual periods.

If unaware of the presence of an abnormal uterus, speculation on the part of the attendant would lead to the supposition that superfetation had taken place in a single uterus. In this case a septate vagina and double cervix led to the discovery of duplication of the uterus.

A half century ago, Article 312 of the Civil Code of France accorded a minimum of 180 and a maximum of 300 days for the gestation of a viable child.

How, then, could one explain a delay of three months in the birth of the second child if conception in each component of the uterus had taken place at approximately the same time? Such a delay would prolong the period of gestation in the case of the second fetus to twelve months—a most unlikely situation! It is more reasonable to assume that conception in the second uterus took place approximately two and a half to three months after that which began in the first.

It would be logical, therefore, to assume that this was a true instance of superfetation.

One must define superfetation in the human being as the implantation of a second fertilized ovum in a uterus already containing a pregnancy of at least one month's duration. In order for this to be possible three phenomena must take place—ovulation, fertilization and nidation.

Investigations conducted by Studdiford[91] led him to conclude that "maturation of the ovum takes place during human pregnancy but that this terminates in degenerative changes and atresia. No evidence could be found that (under such circumstances) ovulation actually takes place. It seems reasonable to assume that the pregnancy hormone through its degranulating effect on the basophile cells of the anterior pituitary (thus diminishing their production of gonad stimulating hormone) depresses ovarian function and prevents ovulation during pregnancy."

Usually, the corpus luteum formed during pregnancy inhibits the development of other ovarian follicles. Hence, it is reasonable to assume that superfetation (if it be at all possible) is not likely to occur early in a pregnancy.

Theoretically, it can occur only at a time when the corpus luteum has waned —around the fourth to the fifth month. Nevertheless, Ravano[70] has provided evidence to support the possibility of ovulation in the early months of an existing pregnancy. He found no less than 5 per cent of 100 pregnant women presenting signs of recent rupture of a corpus luteum.

Since the uterine cavity is not obliterated by the fusion of the decidua vera and the decidua reflexa until about the third month, fertilization of an ovum that has matured in spite of an already existing pregnancy theoretically should be possible. For the same reason, nidation as well is possible up to the third month. Such possibilities become more probable in the event that fusion of the decidua vera and decidua reflexa be delayed beyond the period when it "normally" takes place.

In view of these theoretical considerations Studdiford's conclusion that "we must consider the early reported cases of superfetation as misinterpretation" seems to be untenable. Although this phenomenon must be exceedingly rare and certainly difficult to prove in the case of a single uterus it is not so difficult to believe it possible in double uterus, especially if the cavity of the second uterus

has not yet been completely obliterated by the fusion of the decidua vera and decidua reflexa that have formed in response to a pregnancy in the first uterus.

Menstruation from the nongravid double uterus may take place simultaneously from both members or appear from only one at a time.

Normally, it is true that menstruation ceases from the single uterus in the presence of an ectopic pregnancy. Also, a decidua vera forms within the nonpregnant uterus. One would expect, therefore, that menstruation would not occur in the empty member of a unilaterally gravid double uterus. Yet, the case of probable superfetation cited above had what appeared to be three apparently normal menstrual periods between the birth of her two infants. Murless and McLaughlin's[59] patient, described later, had "two showings of blood during the early gestation period." It is, of course, possible that these "showings" were not true menstrual flows, being instead the result of cyclical bleeding.

Soifer[87] described what appears to have been a true case of superfetation. While doing a Cesarean section on a uterus containing an eight or nine months' old fetus, he noticed that this gravid uterus was separated from another uterus situated on its left by a pronounced plica umbilicalis media. The second uterus possessed a normal tube and ovary. The plica umbilicalis extended downward from the umbilicus and served as a curtain between the two uteri. About twenty hours after the Cesarean section, a second fetus was found on the vulval pad. It measured 1¾ in. from crown to coccyx and appeared to have been dead no longer than seventy-two hours, judging from its well-preserved state. The living infant, delivered by section, weighed 7 pounds.

In 1927 Murless and McLaughlin[59] asking the question, "Does superfetation occur?" reported what they considered to be a possible case. Just three months after a patient of theirs had given birth to a normal male infant weighing almost 6 pounds, the same woman was delivered of a normal female infant that weighed 6 pounds and 13 ounces. The placenta obtained after the birth of the second fetus measured only 4 in. in diameter and was only ¾ in. thick. This patient, as noted previously, had two showings of blood during the early gestation period.

Instances of supposed superfetation have been reported by Buyalskiy,[17] Cassan,[18] Trapet[94] and others. Moench[57] added the case report of a woman who had given birth to a seven months' fetus and who, according to a midwife, passed a 4 months' fetus three days later.

Premature labor as regards the second product of conception is not uncommon.

In 1921 Radasch[69] published a comprehensive review of the reported cases of superfetation.

TRIPARTITE UTERUS

Gould and Pyle[35] cited a case report by Thilow describing a tripartite uterus—one that was divided into three small portions.

HERNIA OF THE UTERUS

Debierre[25] mentioned thirteen instance of herniation of the uterus in the right inguinal region and seven in the left. Gould and Pyle[35] referred to even rarer forms such as crural, umbilical and obturator herniation through the linea alba.

A cure by radical operation was obtained by Barbet[6] in a case presenting a recto-vaginal cloaca plus inguinal herniation of a hemi-uterus and its accompanying adnexae.

DIVERTICULUM OF THE UTERUS

According to Sussig[92] what the Germans call *"Divertikelschwangerschaft"*

— pregnancy in a diverticulum — was first described by Schickele.

Piskaceck's[66] definition rendered pregnacy in a previously existing diverticulum, which might be considered the only true type of diverticular pregnancy, difficult to substantiate as a distinct abnormal entity. He believed that such a classification can be made *only* when the diverticulum of the uterus contains both the fetus and the placenta.

Very few cases have appeared in the literature. A study of those described with sufficient detail leads one to consider them as instances of placental attachment in a secondary sacculation of the uterus rather than true diverticular pregnancy . . . if we accept Piskaceck's definition.[26, 27]

Sussig's patient aborted a six months' fetus. Abundant hemorrhage followed. Attempts to remove a retained placenta proved unsuccessful. After hospitalization, further attempts were made under general anesthesia. It was impossible to remove the placenta. Bleeding continued. It was then noted that the placenta seemed to be situated in what was considered to be a diverticulum of the uterus. Because the wall of this "diverticulum" felt so thin that manual perforation seemed imminent, abdominal hysterectomy was performed.

The extroflexion of the uterus was of the size of a large man's fist and its surface was traversed by veins.

The fibrous placenta was intimately adherent to the uterine musculature and could be removed only partially even after the uterus had been excised. The layer which remained adherent seemed to invade the musculature of the "diverticulum." The muscle tissue in the latter was brittle and spongy and reached a depth of only 2 mm.; whereas the musculature of the nondiverticulated part of the uterus was 3 mm. thick.

The pathogenesis of so-called diverticulum of the uterus is probably as follows: Placental attachment occurs at a site of atrophic mucus membrane. Decidual formation fails to take place normally at this area. The advancing chorionic villi invade the muscular layer directly and destroy some of the muscular bundles. This leads to thinning out and sacculation of the uterine wall, giving the appearance of diverticulation.

This view is borne out by pathologic findings as reported by Lehman[50] in a woman who died from hemorrhage following repeated unsuccessful attempts to remove an adherent placenta. The attending physician, after removing part of the placenta, entered what appeared to be a diverticulum arising from the right side of the fundus. He became alarmed, fearing that he had perforated the uterus, when suddenly he felt that his right hand was pressing against the anterior abdominal wall. Hospitalization followed soon after, but the patient expired before anything could be done in her behalf.

Upon microscopic examination of the uterus after necropsy it was noted that the villi of the placental site within the apparent diverticulum were well formed, but no sign of a decidua could be found. The spongy layer was absent. Villi extended down to the thinned muscular layer, being separated from the latter by a more or less wide layer of fibrin. In some places the villi were isolated between separate muscle fibers that stained poorly. They did not extend to the serosa nor did they perforate the peritoneal covering. Definite decidua formation was present in sections taken from the site of placental attachment to normally thick uterine wall.

Whether with a normal placenta there can be "diverticulum" formation from other causes remains to be decided. Lehman discussed a case of Schaeffer's which

proved to be puzzling to him. A "diverticulum" was found in the pregnant right half of a duplex uterus. The bulging of the diverticulum was limited to the site of placental attachment. A decidua, however, was seen distinctly throughout the site of attachment. Furthermore, there was no evidence of penetration of the musculature by chorionic villi.

IMPERFORATE UTERUS

Gaucher[32] reported an extremely rare form of arrested development in a woman aged 44. Her uterus was solid, that is, no trace of a cavity was discernible. Nor was either tube patent.

Although the ovaries appeared grossly normal, menstruation had never appeared, even vicariously.

ABSENCE OF THE UTERUS

Mention of this abnormality appears frequently in the literature, even absence of both uterus and vagina.[20, 29, 37, 38, 60] Occasionally, one encounters citations of absent uterus, absent vagina and missing adnexae associated with some deformity of the bladder and kidneys.

In Parakh's[61] patient a large central kidney and one ovary were found, the uterus, both tubes, vagina and the other ovary being absent.

Cullen's[21] case lacked a uterus, vagina and a left kidney. The right kidney lay in the pelvis. Oddly enough, in view of the absence of the uterus, both tubes and both ovaries were present. The adnexae, however, were herniated into the corresponding inguinal canals.

The uterus in Dannreuther's[22] patient was dextroverted. The left tube, ovary, broad and round ligaments, kidney and ureter were congenitally absent.

A not uncommon finding associated with utero-vaginal abnormalities is a persistent urogenital sinus.[10, 90]

In 1863 Sedgewick[83] reported absence of a uterus in three out of five daughters of the same parents. Seven years later, Phillips[65] added the case histories of two sisters similarly afflicted.

ABSENCE OF THE CERVIX

Congenital absence of the os uteri, as noted in the second case reported by this author, has been described infrequently.[53, 54]

Mo[56] and Firket[30] have each encountered cervices that lacked a canal.

ABNORMALITIES OF THE VAGINA

The vagina may remain partly or completely solid. Foreshortened vaginae, some only 1 in. long, are encountered infrequently. Complete absence is quite rare, but has been noted.[71]

A most singular case, authenticated by autopsy, was that of a girl of 20 in whom vicarious menstruation occurred regularly from the gums. This patient had no uterus, her vagina was closed and the vulvae were obliterated.[14]

Hahn[39] reported a case of vaginal atresia wherein vicarious menstruation took place *per urethram*. Other instance of vicarious menstruation in patients with an atresia of the vagina have been recorded by Richardson,[73] Rubini[79] and Watson.[97]

Vicq d'Azir's patient[95] lacked a uterus, vagina and ovaries. No prostate could be found, nor was there any evidence suggesting male primary or secondary characteristics. Coitus took place through a markedly distended urethra which, oddly enough, was not accompanied by any urinary disturbances. Ferguson[28] mentioned copulation per rectum in a case of his that lacked both uterus and vagina.

Hematocolpos may be present in the proximal portion of a partially solid vagina. Baudet[8] described an anomaly wherein the normal half of a double va-

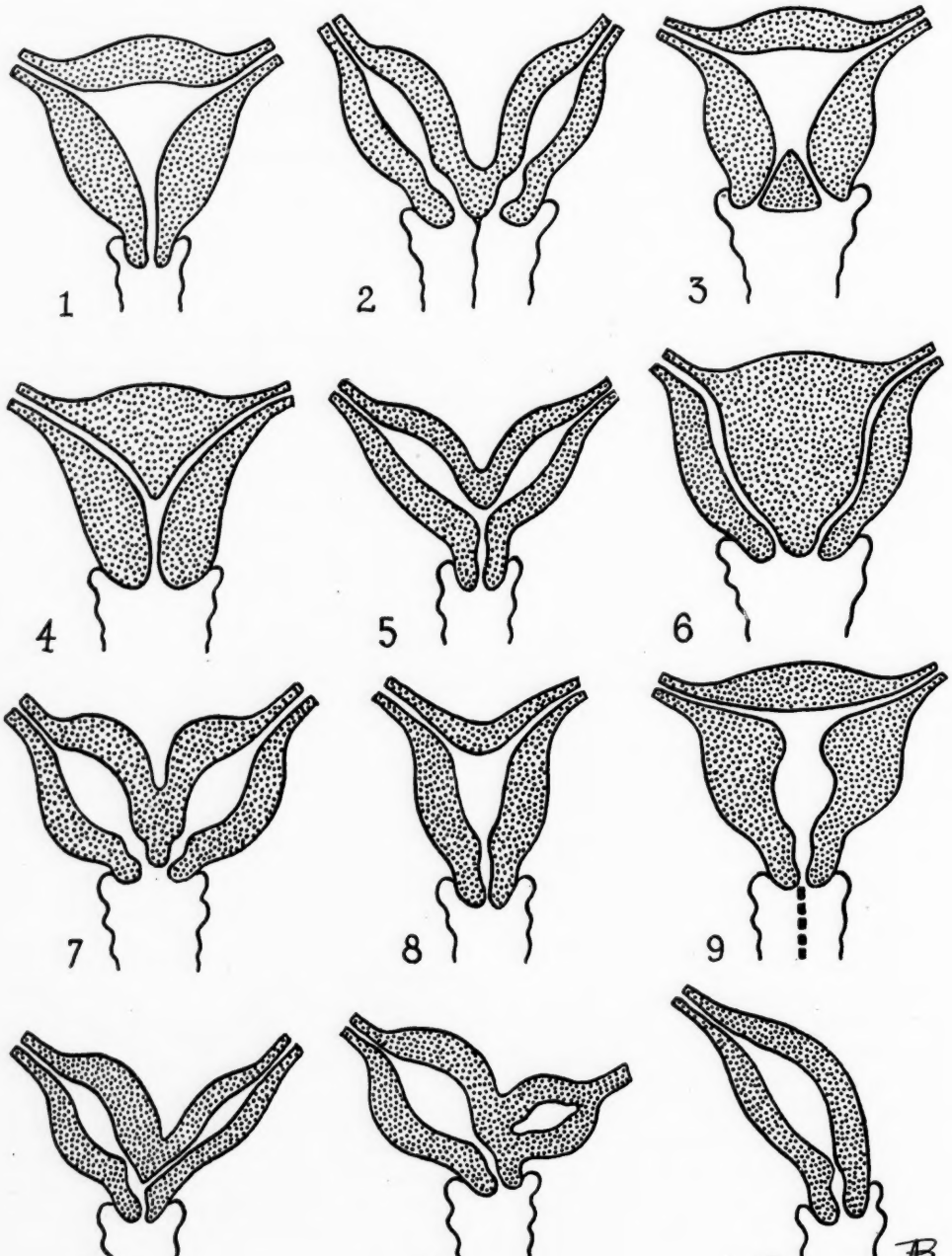


Fig. 3. Abnormalities of the uterus.

gina led to the gravid component of a didelphic uterus. The other vagina was solid in its distal part. Between the imperforate area of the abnormal vagina and the nonpregnant member of the double uterus a marked hematocolpos existed. Such a swelling could lead to delay in the expulsion of the fetus by narrowing the birth canal.

Double vagina with an associated single uterus is not rare. The most frequent example is the result of a division of the vagina into two compartments by a septum that separates a blind pouch from the "normal" compartment, the latter leading to the single cervix.

True double or duplex vagina is usually associated with bipartite or double uterus. Hyde's case[44] had two cervices as well.

Although vaginal septae are usually longitudinal, occasional transverse septae have been noted. These proved to be either a hindrance to coitus or to lead to an irregular appearance of the menstrual flow. Until incised or excised they might well interfere with delivery.

Sanger[80] reported a supernumerary vagina that was connected with the normal vagina by a fistulous opening. He did not consider this to be the result of a patent Gärtner's duct. The latter, it will be recalled, is one of the tubules of the epoophoron running parallel with the Fallopian duct, the ductus epoophori longitudinalis. It seems, moreover, that Sanger's patient was a male hermaphrodite in whom androgenous characteristics were present. The genital organs possessed both male and female elements.

Bizarre situations arising from anomalous opening of the vagina into the rectum, the bladder, the urethra and even upon the abdominal wall have been recorded. Strick's[89] patient, congenitally lacking a uterus, had an anomalous vulvo-vaginal opening. Vulvar anus has been seen in association with closure of the vagina and bifid cervix.[76]

Emergence of the menstrual flow took place thru the anal orifice in a woman who, lacking an external vaginal opening, indulged in coitus per rectum.[62] When pregnancy occurred, forceps extraction per rectum effected delivery of the fetus. A similar case was reported by Bonnaine.[12] Hunter's[42] patient had double vaginal opening into the rectum. Delivery of a seven-month fetus was done per rectum. Copulation in the latter case was also per anum.

Gould and Pyle[35] cited a case report by Rossi from a hospital in Turin. An enormous tumor presented at the site where a vagina normally would have been. No opening was present. Upon incision the tumor was found to be a living infant. More detailed examination led to the discovery that the vagina opened into the rectum.

Opening of the vagina upon the abdominal parieties is extremely rare. Several cases have been collected by Le Fort (quoted by Gould and Pyle). Such an abnormal finding has never been known to be associated with a viable fetus.

FALLOPIAN TUBES

Congenital absence of both Fallopian tubes is rare. According to Chill[19] and to Spencer[88] recurring peritonitis with an accompanying lack of external signs of menstruation may be associated.

Deficient development of one or both oviducts is not too uncommon. Examples of this are the uterus bicornis unilatere rudimentarius and the uterus with a closed accessory horn.

Despite the presence of a canal in approximately 80 per cent of rudimentary horns, they lack connection with the vagina.

Normal development of a tube except for failure to be connected with the

uterus has been described by Bonnaire and Durante.[13]

Double lumen in otherwise normal Fallopian tubes has also been reported.[52, 55]

Peterson[64] has described a horseshoe tube; while Hüter[43] reported fusion of one tube with its opposite.

Congenital absence of a tube need not be associated, as claimed by Blot,[11] with rudimentary development of the ovary of the same side. In the second case, described by the author at the end of this paper, the left tube was represented by a fine fibrous band—practically a complete absence of the tube. Nevertheless, the left ovary seemed to be perfectly normal.

Multiple tubes have been described by Bovée,[15] Robinson,[74, 75] Victor,[96] Kossmann,[48] Knube,[49] Bab[5] and Le Lorier and Durante.[51] In most instances these were fused and adherent either to the ovary or to the uterus.

Supernumerary osteal openings in single tubes have also been reported.[45, 67, 72, 77, 78]

Hernia of the tubes has been seen infrequently.[4, 9, 58, 81]

Fuller[31] operated on a patient in whom an abnormal tube was found in a femoral hernia.

ABNORMALITIES OF THE OVARY

Complete absence of the ovaries occasionally occurs. The presence of only one ovary is not too rare. The level of secondary feminine characteristics, furthermore, does not necessarily parallel the degree of failure in ovarian development. Whereas a woman with but a rudimentary development of her uterus and ovaries was described as having none of the physiologic characteristics of her sex, other cases with similar anatomical defects were decidedly feminine and quite passionate besides.

Several types of supernumerary ovaries are known . . . the ovary succentauriatum, the accessory ovary, cases in which the ovary is divided by ligamentous bands and, lastly, entirely distinct supernumerary ovaries.

Debierre[23] described inguinal herniation of the ovary. Puech[68] collected eighty-eight such cases. Gould and Pyle[35] cite Otte's having seen bilateral crural ovarian hernia and a case reported by Haller and Borellus of double ovarian supply in a woman who had two uteri, two vaginae and double pairs of vulvae. The presence of a third ovary was noted by Sippel.[84]

Griffith[36] described a specimen in the museum of St. Bartholomew's Hospital in which the ovaries were located on the surface of the pelvic peritoneum. The uterus and vagina were absent. The pelvis, as was said to be usually the case, had some of the characteristics of the male type. In the discussion of Griffith's report Matthew Dincan stated that he had seen a similar case in which the vagina had measured not more than 1 in.

Displacement of the ovaries into the cul-de-sac of Douglas, against the vaginal wall or against the rectum may cause nausea during either coitus or defecation. If associated with malformations of the other genital organs, the presence of ovaries in vulvae that resemble an imperfectly fused scrotum may well be mistaken for evidence of hermaphroditism.

OTHER BIZARRE FINDINGS

Smyly[86] reported rupture of a horn in a two-horned uterus. Rupture of a gravid horn in a uterus bicornis unicollis with recovery after operation was described by Brugh[16] as well as by Gérin-Lajoie.[33]

Amputation of the right horn of a bicornuate uterus because of the presence of an abscess within this horn was fol-

lowed by an uneventful normal pregnancy in the other horn.[2]

Menstrual distress has been noted frequently in association with abnormal uteri. Puech[68] has reported hematometra in the rudimentary horn of a unicorn uterus . . . Schwartz[82] hematocolpos, hematometra and bilateral hematosalpinx in a case of uterus subseptus with double cervix and double vagina. De Zilwa[25] added three cases of uterus bicornis associated with unilateral hematometra. Dysmenorrhea resulted from hematometra in the rudimentary horn of a uterus bicornis unicollis.[7]

KEY TO CHART OF ABNORMAL UTERI

1. Normal uterus.
2. Uterus duplex, bicornis with septate vagina.
3. Uterus subseptus unicorporeus with septate cervix.
4. Uterus subseptus unicollis (bipartite uterus).
5. Uterus bicornis unicollis (bicornuate uterus).
6. Uterus septus duplex (uterus bilocularis).
7. Uterus duplex, bicornis with single vagina.
8. Uterus arcuatus.
9. Normal uterus with septate vagina and double hymen.
10. Uterus bicornis, unilatere rudimentarius.
11. Uterus with closed accessory horn.
12. Uterus unicornis.

LABOR IN ABNORMAL UTERI

Surprisingly enough, labor in abnormal uteri is quite often uneventful. Among the obstetrical complications[85] that have been observed in addition to those previously mentioned is postpartum hemorrhage due to atonicity of the nonpregnant member of a double uterus. Poorly developed musculature may lead to rupture and usually is a cause of weak labor pains in such uteri.

Occasionally, the nongravid member may prolapse under the other and become incarcerated in the pelvis.

A uterine septum may impede contraction, tend to produce breech and transverse presentations, lead to weak labor pains, postpartum atony, rigidity of the cervix and adherent placenta.

Cervical septae may obstruct delivery in a most bizarre manner. In a case mentioned by De Lee and Greenhill[24] the fetus actually straddled the septum in the cervix. Before delivery could be effected, it was necessary to excise the septum.

The cervix of the nonpregnant member of a double uterus may be pressed down to the vulva as the descending head of the baby emerges from the pregnant component.

PROBLEMS OF LABOR (AFTER DE LEE AND GREENHILL)

Uterus subseptus unicollis	Placenta may be adherent to the septum
Uterus bicornis (duplex)	Abnormal pains, postpartum hemorrhage likely
Uterus bicornis unilatere rudimentarius	More serious than ectopic pregnancy if pregnancy occurs in the rudimentary horn.
Uterus bicornis (duplex) cum vaginae septum	Double pregnancy possible. Splitting septum seldom necessary. Do episiotomy on side on which baby lies. Do mid-line episiotomy if twins are present.
Uterus arcuatus	Most common anomaly. Often causes transverse and breech presentations.
Uterus with accessory horn	Hematometra results if latter is closed at both ends.

Uterus subseptus unicorporeus cum septate cervix	Child may straddle septum in cervix. Septum may need incision or excision to effect delivery.
Uterus septus duplex (uterus bilocularis)	Abnormal pains and postpartum hemorrhage likely.
Septate vagina with double hymen	May be necessary to cut the hymen being careful not to injure the rectum.
Uterus unicornis	Due to failure of 1 Müllerian duct. Normal pregnancy possible.

CASE REPORTS

UTERUS DUPLEX, BICORNIS, UNICOLLIS WITH SEPTATE VAGINA (*Case 1*)

A review of the obstetrical history of a young woman in her early twenties, that began in 1930 and to date has extended over a fourteen-year period, paints a graphic picture of the extent to which some women will bear up under the trials and tribulations sometimes associated with their efforts to have a family—the inherent right of all womankind. It is an eloquent argument against removing an abnormal uterus simply because it happens to be duplex in character.

On June 30, 1930 a dilatation and curettage for incomplete, spontaneous abortion in the third month of a pregnancy was necessary. At that time the septum in the vagina was first noted. It presented no difficulties other than to puzzle the examiner on his first attempt to do a pelvic examination to determine the condition of the uterus. The index and middle finger, it seems, entered the blind pouch to the right of the septum and it was impossible to palpate a cervix. This was later made clear when the patient was under anesthesia. Although the presence of a vaginal septum should have led to the surmise that an abnormal uterus was probably associated, the walnut sized mass to the right of the pregnant horn of a uterus duplex was interpreted as an ovary and not as the nonpregnant member of the double uterus. Apparently the normal ovary on that side was not palpable. No difficulty was experienced in passing the uterine curette directly into the cavity of the pregnant horn.

The salient features of her history from then on as noted in her case records are as follows:

1: 7/11/30—
Anteversion, anteflexion.

2: 7/21/31—
Mensis regular. Marked dysmenorrhea, premenstrual and first few days of period. Mostly in back. Retroversion.

3: 5/6/32—
Last mensis, 2/1/32. Uterus anteflexed but slightly retrocessed and sinuverted.

4: 9/17/32—
Delivered of seven months' premature fetus, 3 lbs., 11 oz. Baby expired the next day. Frank breech.

5: 11/19/32—
Considerable dysmenorrhea with frequent backache.

6: 3/11/33—
While in an oxygen tent because of lobar pneumonia, delivered of an eight months' premature fetus, 7 lbs., 14½ oz., breech. Baby expired 10 hours later.

7: 1/12/34—
Delivered of an 8 months' premature girl, 4 lbs., 9 oz. Frank breech. Baby lived.

8: 8/19/36—
Spontaneous, incomplete abortion. Uterus retroverted. Much backache. Pain in R.L.Q. of abdomen. Mass in the left side of pelvis, felt on bimanual examination, size of a walnut, considered to be the right ovary which was thought to be cystic. Recommended anterior suspension of the uterus and excision of the vaginal septum. Emptied uterus following day spontaneously.

9: 7/28/36—
Through a suprapubic midline incision, the abdomen was entered and the following abnormality encountered. A true uterus duplex with two distinct horns. Both horns were served by a common cervix. A normal tube emerged from the external aspect of each horn. There was no tube attached to the internal aspect of the horns. Two slightly cystic ovaries were situated in normal relationship to the fallopian tubes. The left was one-half the size of a walnut. The entire uterus duplex, (bicornis) was retrocessed into

the cavity of the pelvis but was not retroverted. Each component of the double uterus was about the size of a walnut. The appendix was 3 in. long, retrocecal and not bound down.

Before entering the abdominal cavity, the vaginal septum had been excised. At its external aspect the septum was about ½ centimeter in thickness. The septum became thinner as it approached its proximal attachment to the right side of the posterior surface of the cervix. The vagina was divided into two complete compartments . . . one leading to the cervix, the other to the right of the septum, being a blind pouch.

The appendix was removed. A Gilliam-Simpson suspension was done to correct the retrocession of the uterus duplex.

10: 6/1/39—

Spontaneous abortion in the second month of a pregnancy.

11: 10/15/42—

Delivered of a frank breech. L.S.A.: 5 lbs., 14 oz. Baby alive.

This was her first full-term baby. This patient, despite her double uterus, has two live children. Of interest is the fact that she had two spontaneous abortions before the third month of pregnancy, three premature deliveries and only one full-term pregnancy. All of the fetuses were small and all were breech in position.

In each of her labors uterine contractions were strong and the pains were normal. At none was the removal of the placenta necessary.

ABSENT VAGINA, ABSENT CERVIX, ABSENT LEFT TUBE, "THUMB-NAIL" UTERUS *(Case 2)*

A single woman of 37 had never menstruated. Nor had there been any vicarious menstruation. There were no secondary male characteristics, her hips were well rounded, breasts well developed and the distribution of the pubic hair feminine in type.

She had a fine tremor of the hands and fingers and stated that at times she felt her entire body tremble. Perspiration from the axillae was marked. Her thyroid was not enlarged, no adenoma was palpable and her basal metabolism on two occasions was within normal limits.

Intermittently, for years, she had right lower quadrant abdominal pain. A gastro-

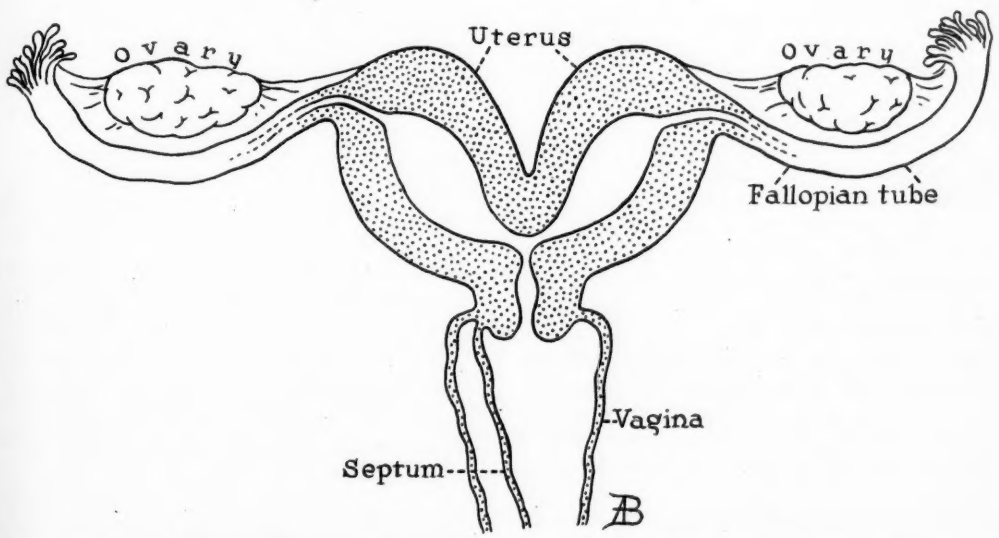


Fig. 4. *Case 1.* **Illustration demonstrating uterus duplex (bicornis) unicollis with a vaginal septum dividing the vagina into a right blind pouch and a left "normal" vagina. Each member had a single normal tube and an associated normal ovary.**

intestinal x-ray series was negative except for a "segmented" appendix.

The labiae majorae and minorae were normal. The clitoris was not enlarged. In place of a normal vagina a blind pouch, or "infolding," was encountered. At most it was a scant 1 in. in length and ⅜ in. in width. It was impossible to palpate a uterus on rectal examination; but what seemed to feel like normal ovaries could be outlined.

At laparotomy for a chronic appendicitis, the following was noted: "The appendix was long, and kinked on itself by adhesions at its middle."

The uterus was heart-shaped with the apex pointing distally and was "thumb-nail" in size. It measured ½ in. from top to bottom, ⅜ in. from side to side and ⅜ in. from front to back. It was in the midline. No cervix was evident. An apparently normal right tube emerged from the diminutive uterus. The left tube was represented by a strand of tissue about the thickness of plain "0" catgut that terminated distally in what appeared to be a normal fimbriated ostium. No opening could be found between the ostium and the strand of tissue to which it was attached. Both ovaries were situated at their normally expected site and appeared perfectly normal. Appendectomy was done.

FIBROMYOMA IN ONE MEMBER OF A BICORNUATE UTERUS *(Case 3)*

A doctor's mother, aged 64, had been bleeding quite persistently and heavily. On bimanual examination a mass was palpated on the right side that seemed to move with the uterus. Due to her age and the possibility of malignancy, Commander Joseph Jacobson (MC) USNR,[18] decided that a panhysterectomy was indicated.

On entering the abdominal cavity a fibroid about the size of an orange was found attached to the right member of a bicornuate uterus. The operation planned was carried out and the patient made an uneventful recovery.

There were a single cervix and a single vagina. Vaginal septae were absent.

Of special interest is the history of three normal, spontaneous deliveries.

SUMMARY

(1) A proper understanding of the various abnormalities of the female genitalia is helpful in the practice of obstetrics and gynecology. Such a background will lead to fewer unnecessary surgical sterilizations of such cases while still in the childbearing period. (2) A brief discussion of the embryology of the Müllerian ducts is included in an effort to clarify the origin of the various abnormalities herein described. (3) Illustrations of some of these abnormalities as well as of several personal cases are provided. (4) The results of an extended survey of the literature are summarized.

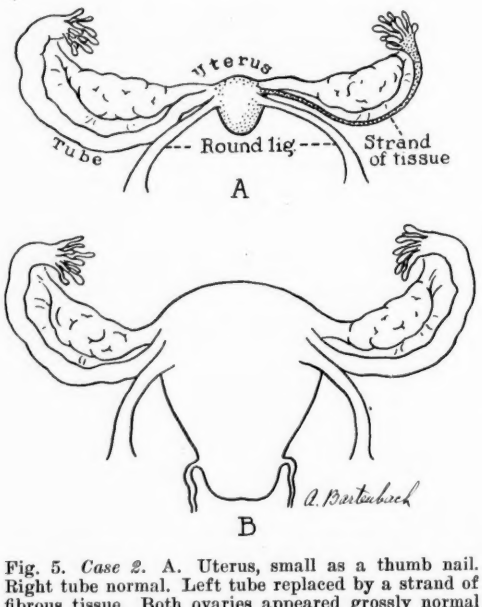


Fig. 5. *Case 2.* A. Uterus, small as a thumb nail. Right tube normal. Left tube replaced by a strand of fibrous tissue. Both ovaries appeared grossly normal and actually were twice the size of the uterus. There was no cervix. The vagina was one inch long and about three-eighths of an inch wide. B. Normal uterus shown for comparison.

BIBLIOGRAPHY

1. Adam: Un cas d'utérus didelphe avec cloisonnement longitudinal du vagin. Bull. Soc. Path. Exot. Par., *17*:335-337, 1924.

2. Aranow, H.: Uterus bicornis unicollis; abscess in right cornu; amputation; normal pregnancy in left cornu. Am. J. Obst., N. Y., 1916, *73*:731, 1916; also, M. Rec., N. Y., *89*:539, 1916.

3. Arey, L. B.: Developmental Anatomy, 4th ed., W. B. Saunders & Co., Philadelphia, revised 1940.

4. Aubrey: Hernia of Fallopian Tube. Bull. Anat. de Par., *17*:143, 1842.

5. Bab, H.: Ueber Duplicitas tubae Fallopii und ihre entwicklungsgeschichtliche Genese. Arch. f. Gynaek., Berl., *78*:393-401, 1 pl., 1906.

6. Barbet, P.: Malformation génitale cloaque recto-vaginal, hernie inguinale gauche d'un hémi-utérus et de ses annexes; cure radicale. Paris Chir., 1921, *13*:34, 1921.

7. Barris, J. D.: Dysmnorrhoea due to haematometra in the rudimentary horn of a uterus bicornis unicollis. Proc. Roy. Soc. Med., London, Sect. Obst. & Gynaec., *17*:57, 1923-1924.

8. Baudet, C.: Utérus didelphe avec une cavité gravide, l'autre conduisant dans un vagin imperforé ayant donné lieu à un hématocolpos. Bull. et mém. Soc. anat. de Par., *90*:466-469, 1920.

9. Bérard, A.: Observations de hernie de la trompe de Fallope; hydropisie du sac herniare; ponction; peritonite; mort. Expérience, Par., *3*:216-220, 1839.

10. Bidder: Vollkommene Spaltung des Uterus und der Vagina; Persistenz des Canalis uro-genitalis, St. Petersb. Med. Ztschr., *5*:592, 1876.

11. Blot: Absence complète de la trompe avec un ovaire rudimentaire du côté gauche. Bull. Soc. Anat. de Par., *31*:284, 1856.

12. Bonnain: Vice de conformation étrange de la région ano-vaginale. L'Union Médicale, *46*:317-318, Sept., 1888.

13. Bonnaire and Durante, G.: Un cas de trompe de Fallope abdominale indépendante de l'utérus. Bull. et mém. Soc. anat. de Par., *88*:128-131, 1912.

14. Bousquet, F.: Note on a case of absence of the uterus and occlusion of the vagina. Trans. of the Obst. Soc. of London, *27*:123-127, 1885.

15. Bovee, J. W.: A Case of Supernumerary Fallopian Tube, Nat. M. Rev., Wash., *9*:77, 1899-1900.

16. Brugh, B. F.: A case of uterus bicornis unicollis with rupture of a gravid horn followed by operation and recovery. West Virginia M. J., *22*:636, 1926.

17. Buyalskiy, I. V.: Descriptio Anatomico Pathologico Uteri Duplicis quorum Uterque Varis Tempore Gravidus Erat. St. Petersburg, N. Greg., 1832.

18. Cassan, A. L.: Recherches Anat. et Physiol. sur les cas d'Utérus Double et de Sperfetat., Paris, Baillière, 1826.

19. Chill, E. A.: Notes on a case of absence of the Fallopian Tubes, with recurrent peritonitis, "Spencer's Operation," Med. Prss & Circ., Lond., n. s. *91*:566-568, 1911.

20. Coussa, M.: Cinq cas d'absence congénitale de l'utérus. Marseille Med., *63*:1345-1348, 1926.

21. Cullen, T. S.: Total absence of the vagina and uterus; right pelvic kidney; absence of the left kidney; the tubes and ovaries on both sides in the inguinal canal. Am. J. Obst. & Gynec., N. Y., *62*:296. 1910.

22. Dannreuther, W. T.: Dextroversion of the uterus, with congenital absence of left Fallopian tube, ovary, broad ligament, round ligament, kidney and ureter. Am. J. Obst. & Gynec., St. Louis, *6*:51-53, 1923.

23. Debierre, C.: Les vices de conformation des organes génitaux et urinaires de la femme. J. B. Baillière et Fils, Paris, 1892.

24. De Lee, J. B. and Greenhill, J. P.: Principles and Practice of Obstetrics, 8th ed., p. 533. W. B. Saunders & Co,. Philadelphia, 1943.

25. De Zilwa, L.: Three cases of uterus bicornis with unilateral hematometra. J. Ceylon Branch Brit. M. A., Colombo, *22*:279-282, 1 pl., 1925.

26. Dongen, J. A. van: A case of uterus saccatus, partial dilatation of the wall of the uterus during pregnancy. Nederl. Tijdschr. v. Geneesk., Amst., Bt. 2, *52*:764-766, 1916.

27. Dorman, F. A.: Posterior Sacculation of Bicornuate Uterus; Caesarian Section. Am. J. Obst. & Gynec., St. Louis, *6*:218, 1923.

28. Ferguson, J. F.: Absence of vagina, uterus, ovaries. Planet, New York, *1*:25, 1883.

29. Ferreira, G. J.: Congenital absence of uterus and vagina; report of a case. J. A. M. A., Chicago, *80*:1616, 1923.

30. Firket, P.: Absence congénitale de la cavité cervicale de l'utérus. Brux. méd., *6*:321, 1925-1926.

31. Fuller, E. B.: Abnormal Fallopian Tube in a Femoral Hernia. Med. Press, Lond., n. s., *108*:232, 1919.

32. Gaucher, E.: Arrêt de développement et imperforation de l'utérus, avec absence complète de cavité utérine et imperforation des oviductes chez une femme de 44 ans dont l'ovaires étaient normaux de cicatrices menstruelles, et qui n'avait jamais été réglée. Bull. Soc. anat. de Par., *55*:229-231, 1880.

33. Gérin-Lajoie, L.: Un cas de rupture d'un utérus bicorne unicervical gravide. Union méd. du Canada, Montreal, *53*:319-322, 1924.

34. Giordano, G.: Di un interessante caso di utero e vagina doppia complicato adematosalpinge edemtocolpo unilaterale. Ann. di ostet., Milano, *46*:79-91, 1924.

35. Gould, G. M. and Pyle, W. L.: Anomalies and Curiosities of Medicine, W. B. Saunders & Co., Phila., 1900.

36. Griffith, W.: Tr. Obst. Soc. of London. *27*:128-129, 1885.

37. Guerdjikoff, N.: Absence complète du vagin et de l'utérus. Rev. méd. de la Suisse Rom., Genève, *40*:251-253, 1920.

38. Hadden, D.: Congenital absence of the vagina and uterus. Am. J. Obst. & Gynec., St. Louis, *1*:732 (Discussion), 742, 1920-1921.

39. Hahn, H.: Congenital atresia of the vagina with vicarious menstruation from the bladder. St. Louis M. & S. J., *69*:265-271, 1895.

40. Hewson, A.: A case of double vagina, double uterus and double Douglas's pouch. Internat. Clin., Phila., 33, s., *2*:208, 1 pl., 1923.

41. Hollander: Ueber eine bisher noch nicht bescriebene uterus anomalie. Berl. Klin. Wchnschr. no. 19, *31*:452-453, 1894.

42. Hunter, J. B.: A case of labor at the seventh month with double vagina and delivery through the rectum. Am. J. of Obst., *11*:593-594, 1878.

43. Hüter, C.: Demonstration eines Präparates von Verwachsung beider Tuben miteinander. Verhandl. d. Gesellsch. f. Geburtsh. in Berl., *18*:92, 1866; also: Monatschr. f. Geburtsh. u. Frankr., Berl., *25*:424, 1865.

44. Hyde, L. W.: A case of double vagina and double cervix. J.A.M.A., Chicago, *75*:877, 1920.

45. Jacobs: Trompe à deux pavillions. Bull. Soc. belge de Gynéc. et d'Obst. Brux., *8*:43, 1896.

46. Jacobson, J., Commander (MC) USNR: Personal communication.

47. Jones, H. M.: Accessory Fallopian tubes and their relation to broad ligament cysts and hydrosalpinx. Brit. Gynaec. J., Lond., *20*:253-255, 1904-1905; also: J. Obst. & Gynaec., Brit. Emp., Lond., *6*:212-215, 3 pl., 1904.

48. Kossmann, R.: Ueber accessorische Tuben und Tubenostien. Ztschr. f. Geburtsh. u. Gynäk., Stuttg., *29*:253-267, 2 pl., 1894.

49. Kube, N. N.: K voprosu o pridatochnikh fallopievkh trubakh i otverstiyakh (tubae accessoriae et ostia accessoria nebentuben). J. akush. i jensk. boliez. St. Petersb., *9*:458-467, 1 pl., 1895.

50. Lehman, E.: Adherent or ingrowing placenta and its relation to so-called Diverticulum Pregnancy. Monatschr. für Geburtshulfe und Gynäk., *68*:201, 1925.

51. Le Lorier and Durante, G.: Trompes multiples, diverticules et cloisennement tubulaires. Bull. Soc. Obst. et Gynec., Par., *22*:137-139, 1933.

52. Magath, T. B.: Double lumen in Fallopian tube. J.A.M.A., Chicago, *72*:1786, 1919.

53. Magruder, L. W.: Congenital absence of os uteri. Tr. Mississippi M. A., Jackson, p. 131, 1886.

54. Mascarel, J.: Absence complète du col de l'utérus. Bull. et mém. Soc. de Chir. de Par., n. s., *9*:800, 1883.

55. Metcalf, H. E.: A double lumen in a human fallopian tube. J.A.M.A., *70*:20, 1918.

56. Mo, G.: Ematoma delle trombe falloppiane, mancanza del canal cervicale dell' utero. Osservatore, Torino, *14*:465-467, 1878.

57. Moench, G. L.: Uterus Duplex Bicollis, Vagina Simplex and Superfetation. Am. J. Obst. & Gynec., *13* (no. 1): 60-64, 1927

58. Morax: Hernie de la trompe de Fallope. Bull. Soc. med. de la Suisse. Rom., Lausanne, *11*:115-117, 1878.

59. Murless, B. C. and McLaughlin, F. L.: Does superfetation occur? Report of a possible case. Brit. M. J., 1309-1310, June, 1937.

60. Novak, E.: Congenital absence of the uterus and vagina; with report of 6 cases. Surg., Gynec. & Obst., Chicago, *25*:532-537, 1917.

61. Parakh, F. R.: Absence of uterus, Fallopian tubes, one ovary and vagina with one large central kidney. Brit. M. J., London, *2*:496, 1919.

62. Payne, R. R.: Cas remarquable d'absence congénitale d'ostium vaginae et accouchement par l'anus. Arch. de Tocologie, *13*:854-855, 1886.

63. Perr[illegible]and, G. E.: Duplication of the uterus and vagina. Canadian M. A. J., *47*:33-34, 1942.

64. Peterson, R.: Horseshoe tube. Am. J. Obst., N. Y., *47*:509, 1903.

65. Phillips: Congenital absence of the uterus. Brit. M. J., 626, 1870.

66. Piskaček, L.: Ueber Divertikel des Uterus. Wien med. Wchnschr., *63*:2689, 1913; also: Ueber Uterus divertikel und ihre Beziehung zur Zchwangerschaft. Gynäk. Rundschau, Berl. u. Wien, *8*:1-14, 1914.

67. Price, J.: A pavillion fimbriated at two points of the tube, or a supernumerary fimbriated extremity. Ann. Gynaec. & Paediat., Phila., *3*:481, 1889-1890.

68. Puech, A.: De l'hématomêtre dans la corne rudimentaire d'un utérus unicorne. Ann. de Gynéc., Par., *2*:359-363, 1874.

69. Radasch, H. E.: Superfetation or superfecundation? Surg., Gynec. & Obst., *32*:339-352, 1921.

70. Ravano, A.: Ueber die Frage nach der Thätigkeit des Eierstocks in der Schwangerschaft. Arch. gynaek., *83*:587-611, 1907.
71. Reeve, J. C.: Complete absence of the vagina with atresia of the uterus. Med. News, Phila., *44*:441, 1884.
72. Richard, Fils A.: Pavillions multiples rencontrés sur des trompes utérins de femmes. Compt. rend. Soc. de biol., Par., *3*:37, 1852.
73. Richardson, T. G.: Atresia vaginae with vicarious menstruation. N. Orl. M. & S. J., n. s., *1*:74, 1873-1874.
74. Robinson, B.: Accessory oviducts. Med. Counselor, Detroit, *22*:1-5, 1903.
75. Robinson, B.: Accessory oviducal ostia. Med. Summary, Phila., *24*:323-325, 1902-1903.
76. Rocher, L. and Lassere: Anus vulvaire, cloisonnement du vagin avec bifidite du col utérin. J. de méd. de Bordeaux, *1*:214, 1920.
77. Rokitansky: Ueber accessorische Tubarostien und über Tubaranhänge. Allg. Wien. med. Ztg., *4*:237, 1859.
78. Roniti, G.: Duplicità dell 'ostio addominale dell 'ovidutto muliebre. Boll. d. Soc. tra i cult. d. sc. med. in Siena, *1*:14, 1883.
79. Rubini: Storia di un atresia e d'una menstruazione straordinaria. Gior. d. Soc. med. chir. di Parma, *10*:36-42, 1811.
80. Sanger: Pyokolpos lateralis im wochenbett mit nachberiger bildung einer Scheidenfistel. Centr. fur Gynäk., Leipzig, *18*:931-932, 1894.
81. Schöller: Mittheilung zweier Falle von phlebitis hepatica neonatorum, und eines Falles von Hernia inguinalis congenita die rechte Tuba Fallopii enthaltend. No. Ztschr. f. Geburtsh., Berl., *8*:264-267, 1840.
82. Schwartz, L.: Uterus subseptus with double cervix and vagina; hematocolpos, hematometra and bilateral hematosalpinx. Am. J. Obst., N. Y., *76*:119-121, 1917.
83. Sedgewick, W.: Heredity. Brit. & Foreign Medico-Chirurgical Rev., *31*:445-478, 1863; also: *32*:159-197, 1863.
84. Sippel, A.: Drei ovarien Dermoiddegeneration der beiden rechts gelegenen. Altere Stieldrehung des einen dermoid. Normales linkes ovarium. Central-bl. für Gynäk., *13*: 305-307, **1889.**
85. Smith, F. R.: The significance of incomplete fusion of the Müllerian ducts in pregnancy and parturition with a report on 35 cases. Bull. Lying-in-Hosp., N. Y., *13*:323-343, 1932.
86. Smyly, W., Sir: Ruptured horn of a two-horned uterus. Tr. Roy. Acad. M., Ireland, Dubl., *33*:332, 1915.
87. Soifer, I. T.: Superfetation in Uterus Didelphys. Am. J. Obst. & Gynec., *37* (no. 4):718-719, 1939.
88. Spencer, W. G.: Absence of the Fallopian tubes and of menstruation associated with recurrent peritonitis. Brit. M. J., Lond., *1*:189, 1911.
89. Strick, E. J.: A case of congenital absence of the uterus with anomalous vulvovaginal anus. Am. J. M. Sc., Phila., *156*:175-78, 1918.
90. Strong, C. P.: Congenital malformation of the genital tract; persistence of the sinus uro-genitalis as a common opening with the urethra; bicornate uterus. Tr. Am. Gynec. Soc., Phila., *16*:473-479, 1891.
91. Studdiford, W. D.: Is superfetation possible in the human being? Am. J. Obst. & Gynec., *35* (no. 5):845-855, 1936.
92. Sussig, L.: Adherent placenta and diverticular pregnancy. Minerva Medica, *9*:708, 1929.
93. Thorek, M.: Double uterus. Chicago M. Rec., *41*:430-435, 1919.
94. Trapet, A. G. L.: Ueber Schwangerschaft u. Geburt bei Doppeltem Uterus. Inaug. Dissert., Bonn, 1909.
95. Vicq D'Azir: Dictionnaire des sciences médicales, *4*:162, Paris, 1812.
96. Victor, A. C.: The question of supernumerary Fallopian tubes with specimens of Fallopian tubes with supernumerary ostia. Boston M. & S. J., *112*:513-515, 1900.
97. Watson, J.: Atresia vaginae; vicarious menstruation. N. York J. M., 3.s., vol. *235*, 1858.
98. Wiart, P. and Sureau, M.: Sur un cas d'utérus double avec vagin partiellement double. Gynéc. et Obstét., Par., *11*:101-110, 1925.

SUMARIO

1. Un conocimiento exacto de las varias abnormalidades de los órganos genitales femeninos es de utilidad provechosa en la práctica de la obstetricia y de la ginecología. Este conocimiento básico evitará o disminuirá el número de esterilizaciones chirúrgicas innecesarias durante el período o edad fértil.

2. Una corta discusión de la embriología del conducto de Müller es incluída con el objeto de aclarar el origen de las varias abnormalidades aquí descritas.

3. Ilustraciones de algunas de estas abnormalidades, como también citas de casos en la experiencia del autor son presentados.

4. Se da en resumen, el resultado del extenso estudio de la literatura.

RÉSUMÉ

(1) Il est utile à l'accoucheur de connaître les différentes anormalités des organes génitaux de la femme. Ces connaisances sont également utiles aux gynécologues. Ainsi armé le chirurgien fera moins de sterilisations inutiles durant la période de l'enfantement. (2) Afin de clarifier l'origine de ces anormalités, l'auteur discute l'embryologie des conduits de Müller. (3) L'article illustre plusieurs de ces anormalités et renferme le rapport de plusieurs cas personnels. (4) L'auteur nous donne les résultats d'une étude approfondie de la littérature du sujet.

Выводы

1. Правильное понимание различных аномалий женских половых органов является очень полезным в акушерской и гинекологической практике. Такая подготовка часто предовращает ненужную хирургическую стерилизацию во время плодоноснаго периода. 2. Для выяснения происхождения этих аномалий статья дает краткий эмбриологический обзор развития Мюллеровских трубок. 3. Даны иллюстрации некокторых аномалий, включая случаи автора. 4. Дан свод результата широкаго обозрения научной литературы.

Appendiceal Coprolith Simulating Ureteral Calculus

W. G. COLEMAN, M.D., F.A.C.S., F.I.C.S.
DETROIT, MICHIGAN

A calculus in the appendix, opaque to x-ray examination, is of sufficiently rare occurrence to make a study of each case reported helpful in the avoidance of diagnostic errors. The history of a patient on whom I operated a number of years ago is here reported in full. The patient was brought to the hospital for an emergency appendectomy. Because of urinary symptoms an x-ray examination led to a diagnosis of ureteral calculi. The patient was a child suffering, very obviously, from an acute abdominal condition which made any delay for further diagnostic procedures unwise and even dangerous.

CASE REPORT

Personal History: Master W. B., 11 years old. Came home Saturday afternoon after double show and drank two glasses of cold milk. That evening he vomited several times. Sunday his abdomen was very sore and patient complained of nausea and a constant desire to urinate. Monday morning he woke up crying and complaining of severe pain in lower abdomen and bladder region with some pain in back. I was called to home by mother at 9:30 Monday morning.

Physical Findings: Boy appeared quite ill, temperature 102, respiration 28, pulse 120. Breathing was difficult and thoracic in character. Throat and chest appeared negative. Abdomen was greatly distended and very tender in lower right quadrant with marked rigidity of right rectus, marked tenderness at McBurney's point and surrounding area. There was also tenderness over the bladder region. Rectal examination revealed marked tenderness especially on right side. Patient was immediately hospitalized.

Diagnosis: Possible perforated appendix with generalized peritonitis.

Laboratory report: Urinalysis (Macroscopic): Specific gravity 1017, acid, albumen trace, sugar negative.

(Microscopic): White blood cells 5, red blood cells 8, hyaline and granular casts 2#.

Hematology: White blood count 26,050, P. neut. 96%, lymph 4%, Hemoglobin 96%, Red blood count 4,500,000.

As result of urinary findings and urinary symptoms, an x-ray of the chest and of the abdomen was ordered.

Fig. 1. X-ray of abdomen showing calculus in the right ureter.

X-ray report: x-ray of chest negative.

X-ray of abdomen: Elliptical shadow of calcium density in the vicinity of the lower right ureter overlying the sacrum. Kidney shadows not definitely delineated. Considerable gas in the colon with slight amount in

the small bowel. *Conclusion:* Radiographically it appears that there is a calculus in the right ureter. (Fig 1.)

Although there was a frequency of urination and the urine contained blood and pus and an x-ray film of the abdomen revealed a stone of high calcium density lying in the region of the ureter with the long axis of the stone parallel to the course of the ureter in the region of McBurney's point, further examination failed to convince me that this was the cause of the acute abdomen.

I decided an immediate operation was indicated for a ruptured appendix, well realizing that many an innocent appendix had been removed, when the underlying cause was a kidney or ureteral calculus, having in mind that if this was a calculus it could be handled by cystoscopic at a later date, and that delay was dangerous.

Abdominal Findings: The abdominal cavity contained approximately 3 ounces of thick muco-purulent exudate. The appendix was lying in right lower iliac quadrant, it was swollen and edematous and was perforated at its mid portion with a firm fecalith present.

Operation: Davis incision. Appendix was brought into the wound without difficulty, meso-appendix clamped and tied off. Appendix was removed, purse string was placed around the stump and a No. 20 soft rubber catheter was sutured into the cecum with plain No. 1 catgut through the stump of the appendix. (Appendicostomy.) Purse string was then tied around the tube. A Penrose tube was then inserted into the right iliac fossa.

The peritoneum and muscle were closed with single No. 1 chromic catgut; the fascia was closed with interrupted chromic, and the skin with plain catgut.

Laboratory report: Postoperative diagnosis: The appendix measures 1 cm. in diameter in the distal half. There is perforation at the junction of the middle and distal thirds. Peritoneum is severely inflamed and covered with purulent exudate. The lumen at the perforation contains a fecalith.

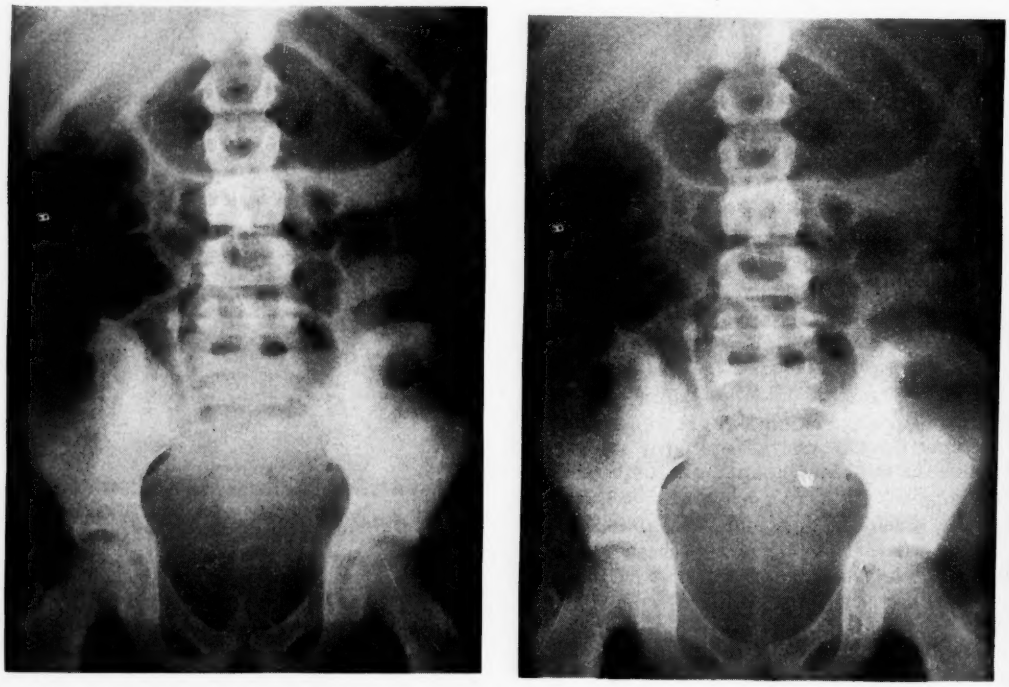


Fig. 2 (*a* and *b*). Postoperative abdominal x-ray, following appendicostomy. No shadow present. (Two views.)

Microscopic diagnosis: Acute suppurative appendicitis with perforation and purulent peritonitis.

Patient made an uneventful recovery. The Penrose drain was removed on third day and catheter on the seventh postoperative day. Discharged on October 18, 1936. Twenty-seven hospital days.

Due to the fact that a hard calculus was felt in the appendix on removal, a second x-ray of the abdomen was ordered.

X-ray report: Postoperative x-ray of abdomen showed no evidence of calculus in either kidney or ureter. Previously reported shadow was not present at this time, the fecalith having been removed with the appendix. (Fig. 3.)

X-ray report of removed appendix: Reveals calculus in lumen with an outline identical to the one seen in preoperative examination of the abdomen. (Fig. 2.)

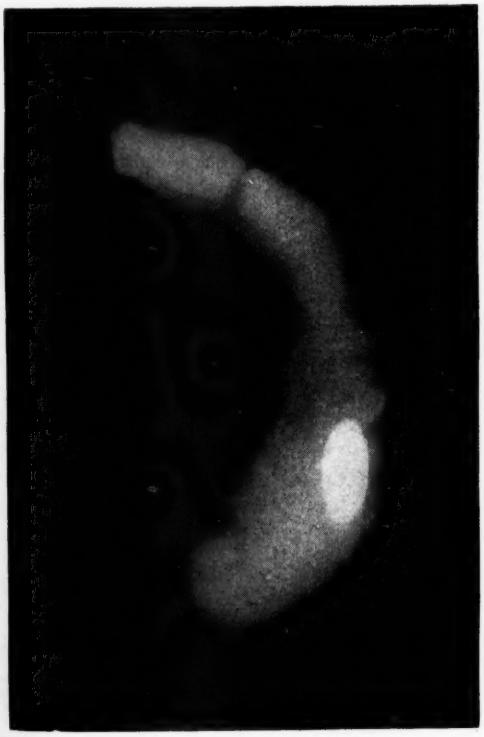


Fig. 3. X-ray of removed appendix revealing calculus in the lumen. Outlines are identical with those of the calculus as shown in the abdominal x-ray.

In the most recent review of the literature on appendiceal lithiasis to which the author had access, Tripodi and Kruger[11] reported that only two of ten cases reviewed were correctly diagnosed prior to operation, (Downes[4], Shahan[10]) both by means of a flat plate of the abdomen. Their own case in a man 33 years old was diagnosed preoperatively. In an x-ray study of the gastrointestinal tract, with the barium still in the stomach, the round, opaque shadow discovered in the right lower quadrant was thought to be a gallstone in the terminal ileum. The six-hour examination revealed the appendix clearly extending out to the calculus. Fluoroscopic examination showed the cecum, appendix, and calculus to be freely movable and the diagnosis of calculus in the appendix was verified at operation. They point out, and rightly so, that errors in diagnosis can be reduced by barium studies of the intestinal tract and by lateral views of the abdomen with opaque catheters in the ureters. However, in Mark's case there were marked urinary symptoms, such as pronounced dysuria, pus and blood in the urine, while the gastrointestinal history was negative. X-ray examination showed two stones, apparently in the ureter. X-ray with ureteral catheters indicated that the concrements were outside the ureter, but moved with the ureter, and the catheter met with obstruction as the concrements were reached. Transperitoneal exposure indicated calculi in the ureter, and a long thin appendix with the two concrements in its tip, and with tip adherent to the posterior peritoneum immediately over the ureter, afforded a complete surprise to the operator.

A case reported by Eastmond to the New York Roentgen-Ray Society and mentioned by Douglas and Le Wald,[3] is a similar case. There was a shadow above the third lumbar vertebral transverse process in a man suffering pains high on the right side. There was an ap-

parent obstruction of the ureter at this point, and a long oval shadow, with its longest axis vertical, simulated an ureteral calculus. The appendix was found adherent to the ureter at this point and after removal of the appendix containing the calculus, the ureter was entirely free from obstruction.

Albert[1] reported the case of a man, aged 43, with stinging pain in right upper quadrant and some tenderness to pressure over the right kidney. The urine contained microscopic quantities of pus. There was mild generalized cystitis. Introduction of a catheter into the ureter up to the pelvis caused duplication of the pain. The pneumoperitoneum revealed calculi close to the liver. At operation, the appendix was found to be retrocecal, extending upward along the decending colon to a point above the kidney and just beneath the gall bladder. Here the tip turned down and contained four calcified fecaliths.

Levi[7] reported a case in which the x-ray shadow suggested stone in the lower pole of the right kidney. Pyelography showed it to be outside the urinary system. At operation a very long appendix was found with tip containing a calcium phosphate stone attached to the lower pole of the right kidney.

There was no suspicion of the correct diagnosis, says Guido,[5] reporting a case of appendiceal calculus in which there was severe pain and tenderness over the right kidney and absence of pain in the right lower quadrant. Intravenous pyelography revealed no dye in the right kidney. The preoperative diagnosis was calculus of the lower third of the right ureter with hydronephrosis. X-ray of the appendix removed was identical with the preoperative film of the abdomen. There were no signs of inflammatory reaction in the appendix.

Jackson[6] reported one case diagnosed by x-ray examination and confirmed at operation and another visualized, but diagnosed as ureteral calculi—appendiceal location found at postmortem examination.

In Wells'[14] case the patient was perfectly well until twenty-four hours before admission. An appendiceal abscess was obvious and drainage was instituted. Concretions escaped from the wound. After lipiodal injection into the sinus an x-ray examination revealed a calcified mass which was thought to be calcified mesenteric glands, but operation revealed stone in the appendix. Such experiences emphasize the danger of sudden perforation and immediate acute peritonitis after a period of silent, symptom-free growth. Some of the stones found in the appendix are laminated and have been mistaken for gallstones.

In the literature reviewed by the author there was no mention of cases of true appendiceal calculi in children. Textbooks on abdominal surgery in children make no mention of such cases. Deaver, in his book on *Appendicitis,* noted that, according to Riedel, fecal concretions are more common in children than in adults. This observation relates to the nonopaque fecalith, which occurs as commonly as in 80 per cent of some reported series, while the opaque stone is rarely found in the appendix (one case in 2000), Bunch and Adcock.[2]

SUMMARY

True calculi of the appendix, opaque to x-ray examination, are very rare in contrast to the common fecalith. A case history of a boy, aged 11, is presented in full, together with brief reviews of cases reported in the literature.

The confusion of symptoms and of x-ray shadows with those of ureteral calculi, and, in reported cases, with renal calculi and calcified mesenteric glands, makes each additional case study an aid to differential diagnosis. These case histories illustrate the silent growth of these stones—a silence which may be

broken by a sudden burst of symptoms calling for emergency treatment, adding to the difficulties of careful differential diagnosis before operation.

BIBLIOGRAPHY

1. Albert, S.: Appendiceal Stones Simulating Gallstones and Kidney Stones. Radiology *4*:428, 1924.
2. Bunch, Geo. H. and Adcock, David F.: Giant Faceted Calculus of the Appendix. Ann. Surg. *109*:143-146, Jan. 1939.
3. Douglas, John and Le Wald, L. T.: Fecal Concretions of the Appendix Demonstrable by the Roentgen Ray. J.A.M.A. *66*:1919, June 17, 1916.
4. Downes, W. A.: Large Fecalith in the Appendix. Ann. Surg. *66*:506, 1917.
5. Guido, Frank R.: Appendiceal Calculus. California and West. Med. *55*:19-22, July '41.
6. Jackson, James: The Roentgen Diagnosis of Appendiceal Fecaliths. Am. J. Roentgenol. *48*:803-806. Dec. '42.
7. Levi, D. A.: Radiopaque Concretions in the Appendix. Lancet *2*:653, 1934.
8. Mark, E. G.: Appendiceal Concretions Simulating Ureteral Calculi. J.A.M.A. *82*:1689, 1924.
9. Naviero, R.: Appendicular Lithiasis. An. Inst. modelo de clin. méd. *20*:418-422, 1939. Rev. Asoc. méd. argent. *83*:1214-1215, Dec. 30, 1939.
10. Shahan, J.: An Unusual Case of Multiple Appendiceal Lithiasis. Radiology *36*:89-90, July, 1940.
11. Tripodi, A. M. and Kruger, A. L.: Appendiceal Lithiasis. Am. J. Surg. *61*:138-142, July, 1943.
12. del Vaglio, F.: Contributo allo studio della litiasi biliare appendicolare. Riforma med. *56*:776-777, June 15, 1940.
13. Verzog, Blondeau and Bouquet de Jolinière: Appendicite aigüe lithiasique à siège anormal diagnostiquée par la radiographie. Bull. et mèm. Soc. d'électro-radiol. méd. de France *27*:505-507, July, 1939.
14. Wells, C. A.: Appendix Concretions Opaque to X-Rays. Brit. M. J. *2*:1041, 1930.

SUMARIO

Los verdaderos cálculos en el apendix, opacos en el examen radiográfico, son muy raros en contraste con las comunes "piedras fecales" ("concreciones"). Un caso histórico es presentado en lo total en un joven de 11 años, junto con una lijera devista de los casos citados en la literatura. La confusión de síntomas y de las sómbras radiográficas con aquellas de cálculos en el ureter y en casos citados de cálculos renales y de calcificaciones en glándulas mesentéricas, añaden a los casos en el estudio que facilitan el diagnóstico diferencial.

Estas historias de casos demuestran el crecimiento silencio de estas piedras, un silencio que puede ser interrumpido por un violento ataque de síntomas urgentísimos, necesitando intervención chirúrgica y amentando las dificultades a un cuidadoso diagnóstico diferencial antes de la operación.

RÉSUMÉ

Les vrais calculs de l'appendice, opaques aux rayons-x sont rares. Les fécalithes sont beaucoup plus fréquents. L'auteur rapporte en détail un cas de calcul de l'appendice chez un garçon de onze ans. Il faut une révue brève des cas rapportés dans la littérature. Il est facile de confondre les symptômes et les ombres des rayon-x de ces cas avec ceux que presentent les calculs de l'urétère, les calculs du rein, les glandes calcifiées du mésentère. Ces cas se développent silencieusement: un silence qui peut se transformer soudainement en cas d'urgence. Le diagnostique différentiel est difficile.

Выводы

Настоящие камни червеобразнаго отростка, непроницаемые рентгеновскими лучами, встречаются редко по сравнению с каловыми камнями. Представлены: полная история болезни одинадцитилетняго мальчика и обзор научной литературы. Такое представление каждаго изученнаго случая очень содействует постановке дифференциальнаго диагноза так как симптомы и рентгеновския тени мочеточных и, в описанных случаях, почечных камней, и также, тени кальцифицированных желез брыжейки часто смешиваются с симптомами и тенями камней червеобразнаго отростка. Эта статья иллюстрирует тихий рост этих камней—тишина, которая может быть нарушена внезапной вспышкой симптомов, требующей немедленнаго лечения, что само по себе делает трудной правильную постановку дооперационнаго диференциальнаго диагноза.

Physical Medicine and the Rehabilitation Problem

WILLIAM D. McFEE, M.D.*
BOSTON, MASS.

REHABILITATION has been variously defined. The connotation under consideration here is the restoration to health of those who have become physically and mentally handicapped in war and in industry. These remarks will be confined to the rôle of physical medicine in this stupendous problem.

Physical medicine is often referred to as Physical Therapy and as Physiotherapy, but there are those of us who believe that "Physical Medicine" is the term of choice for this specialty as practiced by regularly qualified physicians. It embraces the medical use of all physical agents, such as water, light, electricity, massage and exercise to produce heat and cold, mechanical effects and chemical changes in tissues; also, the use of electricity in certain surgical and diagnostic procedures. Practice in this field requires the training and clinical experience of the specialist and specialized training on the part of the technician working with him.

The scientific background and technics for these procedures have been established by a long and distinguished line of capable workers, through whose original studies we have received important contributions to the healing art.

In World War I, the work of pioneers was by necessity crystallized into the foundation for modern physical medicine as the basis for rehabilitation of the disabled. It was Tait McKenzie's pocket edition, *Reclaiming the Maimed,* which was used as the manual in the Reconstruction Camps organized by him in England, Canada and later in the United States to care for the returning casualties. It was Granger's *Physical Therapeutics* which later laid the foundation for the standardization of physical therapeutic procedures, particularly in electrotherapy. It was the vision of the surgeon, William Seaman Bainbridge, which was responsible for the introduction of physical medicine into the United States Navy, through his development of a physical therapy clinic in the U. S. Naval Hospital at Brooklyn, New York.

Following the last great war, thousands of our armed forces returned with such crippling conditions as the so-called "shell-shock," amputations, peripheral nerve paralyses, various types of wounds, some badly infected, fractures of all extremities, skin diseases, burns, bursitis, back strain, phlebitis, arthritis and bone and joint injuries, with the prospect of months and years of impairment of function or total disability. The problem of rehabilitation in its broadest sense was at hand. The medical heads of the military services recognized physical medicine as a potent ally in the prodigious undertaking before them. Then began the labor of standardizing methods and apparatus, and installation of equipment in clinics for carrying out procedures in physical medicine, which were defined by the Surgeon-General of the Army as "Physical measures, such as are employed under Physiotherapy, Hydrotherapy, and Mechanotherapy, active exercise (indoor and outdoor) games, and

* Presented at the Fourth International Assembly, held in New York, June, 1943.

passive exercise in the form of massage." It included manipulations and exercise in all forms, all electrical treatments, all forms of heat and cold, including hydrotherapy, all forms of radiant energy, including radium, x-ray, ultraviolet ray, the visible ray spectrum, etc. and occupational therapy.

The late Dr. Frank B. Granger was attached to the office of the Surgeon-General of the Army, and the first complete clinic was organized at the Walter Reed General Hospital in Washington, of which the writer was privileged to become the director.

When maximum activity was reached the personnel consisted of five physicians and eighty technicians, 90 per cent of whom had been well trained in massage and corrective exercise. Ten thousand treatments per week were administered by all forms of physical therapy.

All cases came to the clinic with diagnoses and recommendations from the various department chiefs who referred them for treatment. Findings were thoroughly checked. If not in agreement, a conference was arranged between the chief of the referring department and the chief of the physical therapy department. After a common understanding was reached, the director of the physical therapy clinic prescribed the treatment, of which he was in complete control.

Equipment consisted of all apparatus approved by the best authorities in physical medicine: whirlpool baths, Sitz baths, Scotch douche, vibrators, infra-red and high wattage incandescent lamps and ultraviolet lamps for general and local application, light cabinet baths, static, galvanic apparatus for ion transfer and chemical changes in tissue, and for electrodiagnosis of injured nerve or muscle tissue, sinusoidal apparatus, of the motor generator type, for involuntary muscle exercise, high frequency machines for the production of diathermy, desiccation and coagulation.

A research clinic was established, which operated independently of the regular clinic and met following regular hours. This was entirely voluntary and was made up of physicians from the physical therapy clinic and from the pathologic laboratory. Animal experiments were conducted in the field of electrotherapy. For this, special thermometers were developed by the Bureau of Standards. Later these were replaced by the more accurate thermocouples. One result of these investigations was the proof of the production of internal temperature of varying degrees by constantly controlled high frequency currents.

The work of this clinic was at all times absorbing and challenging. There is obviously not the time for a thorough discussion of the cases treated. To cite a few:

A case of renal calculus, which had blocked the ureter and was interfering with kidney function, was sent to us after many attempts to change the direction of the calculus with no satisfactory results. Treatment by diathermy and galvanism was instituted. It took three treatments to complete the passage of the calculus into the bladder. This was accomplished after the G. U. Department had stated that two months would be considered a conservative estimate of the time required. Progress was checked with x-ray.

A boy was sent to the clinic who had had an accident to the lower leg, with fracture of the tibia and paralysis of the anterior tibial nerve with foot drop. Treatment consisted of straight galvanism with chlorine ionization, diathermy and massage. The condition was extremely painful. On a visit to the physical therapy department the officer who had referred the case from the fracture department, recommended dis-

charge of the patient, as in his opinion no progress was being made. We were not in agreement as to the progress. In conference with the chief of the surgical department, it was decided that we should keep the boy for a further period, inasmuch as it was learned that there was no physician near his home town who could give proper treatment for this condition. As a result, in four more weeks, he was returned to his home with a comfortable and useful leg, ready to take up his usual occupation.

We received a victim of mustard gas, whose face was a mass of pulp, unrecognizable. The diagnosis was mustard burns. Ultraviolet was used, followed by chlorine ion transfer by means of the galvanic current followed by very light massage. Massage was gradually increased to maximum tolerance. The circulation was gradually restored. After six weeks maximum recovery was reached with a good result.

An interesting case was that of a young man who developed empyema following pneumonia. A discharging sinus of considerable depth was present. This had undergone treatment with various irrigations and hot water bottles. When no change in the condition was noted, he was sent to the department of physical therapy for observation and treatment. For purposes of exploration we used a very small electric bulb attached to an insulated wire which was passed through a small rubber tube to the base of the sinus. The view obtained showed a deposit of lymphoid tissue at the base. We then removed the lamp and passed a similar wire to the lesion by means of which we desiccated the diseased tissue, destroying it. Entire recovery took place after the third treatment.

By similar methods a large percentage of the maimed and diseased soldiers were returned to useful and profitable employment. This may all be summed up in a statement by Dr. M. W. Ireland, Surgeon-General of the U. S. Army at that time, when he said that "The use of the various measures of Physical Therapy has made possible the return of disabled soldiers to their occupations of civil life, who without the help of these measures would have remained permanent hopeless cripples and invalids."

With the successful results of physical medicine in the rehabilitation program of this period, it is difficult to understand why organized medicine has neglected this field in the intervening years. This has been particularly true of the civilian hospitals and medical schools in the United States, except in a few sections of the country. This neglect or indifference is accountable for the present scarcity of trained physicians, and technicians in this field. The Army, Navy and Veterans' Administration have maintained Physical Therapy Departments under able leadership. However, as the problem of rehabilitation broadens, the lack of trained men in the field will be in evidence. Few of the physicians recruited into the service from civilian life have received any previous training in physical medicine. Intensive courses are being given at the Mayo Clinic, Columbia University, and at other centers, but it is going to be difficult to cope with the need for trained physicians and technicians.

The conditions of totalitarian warfare are vastly different from those of twenty-five years ago, but we still shall have essentially the same general problems to combat in the rehabilitation of the casualties of this war; grossly wounded men with tissue loss or damage, fractures, and deformities, osteomyelitis, nerve loss or injury and the results of burns requiring extensive convalescence or reparative and reconstructive surgery. Due to the rigors of modern warfare, the dimout requirements, and other privations in the

remote reaches of the earth, many of the casualties, including prisoners of war, will be cases of neuroses and psychoses. In all of these cases, physical therapy in some form is indicated.

The military forces are aware of these facts and manuals covering regulations for such procedures are in use. In the hospitals with these services are well equipped departments of physical medicine, and plans are in the making for the enlargement of these to accommodate the diseased and wounded.

A typical modern clinic of the United States Army is that of the Lovell General Hospital, in Ayer, Massachusetts, where a well qualified specialist in physical medicine, a first lieutenant in the medical corps, is in charge. The set-up is similar to modern clinics in the civilian hospitals. The main treatment room (approximately 80 ft. x 15 ft.) is adjoined by the hydrotherapy and occupational therapy suites. Types of injuries seen are largely, at present, machine gun bullets, 88 millimeter and 20 millimeter shell wounds, many burns and accidents from airplane and automobile, many fractures of all extremities, and many accidental gunshot wounds.

Treatment consists largely of some form of heat—radiant heat and whirlpool. Massage is usually limited to effleurage. Electric stimulation with the galvanic interrupted current is used, but most reliance is placed upon exercise. There is a great deal more of passive, *i.e.*, stretching, motion than is ordinarily used in civil practice. To hasten rehabilitation, much dependence is placed upon Occupational Therapy: the printing press to stimulate activity in the upper extremities; bicycle jig-saw and sanders for the lower extremities, and all forms of carpentry are used. Cabinet light baths are given for arthritic conditions. Fever therapy is often combined with chemicals for the treatment of drug-resistant gonorrhea.

Equipment is all of the very latest manufacture in all departments. The only equipment not universally found which could be of further value is short and long wave diathermy. These are installed in the older Army hospitals. Organization of Physical Therapy in the Army is much like that in civil hospitals. In most hospitals, a medical officer is in complete control of the treatment in his department. Patients are checked approximately at two-week intervals. If no progress is noted after four weeks, a recommendation is made to the referring surgeon to discontinue the treatment entirely.

In the large United States Naval Hospitals, like the one at Great Lakes, Illinois, thoroughly equipped physical therapy units are maintained, under adequate medical supervision and trained personnel. The medical officer is usually in charge of both the physical therapy and the x-ray departments. Short wave diathermy is used a great deal in the Navy to treat inflammations and traumatic conditions involving bones, joints, bursae, muscles and tendons, which are frequently injured through the nature of that service and its activities. Desiccation and coagulation of all varrucae on all parts of the body except the palms of the hands and the soles of the feet are done in the physical therapy department. War casualties thus far have consisted of late results from burns, nerve injury, fractures, shrapnel wounds and neuroses. By using physical therapy the men are improved and returned to duty more rapidly.

The Veterans' Administration under General Hines and under the medical direction of Dr. Charles W. Griffith, have maintained high standards in physical medicine and well-developed units, thoroughly equipped and excellently manned,

are found in the ninety-one hospitals and three regional offices throughout the country. In each hospital appropriate facilities for physical medicine are available and are planned for in accordance with the specialty treated in the particular hospital.

In England, as part of the rehabilitation program, all Emergency Medical Service Hospitals of 300 beds or over are required to maintain physiotherapy departments. The orthopedic centers have been enlarged by temporary quarters to provide adequate facilities for the great volume of casualties on the civilian front requiring physical medicine, including remedial gymnastics and occupational therapy. There are rooms for crafts and outdoor space for football, cricket, tennis and golf. Hospital gardens also function as remedial agents. Many large hospitals are provided with physical training instructors. As soon as the convalescent is capable of doing so, he joins one of the carefully graded groups for physical exercise. An "Organizer" keeps the patient's therapeutic timetable. Medical supervision is considered essential to complete the efficiency of a rehabilitation department and to insure correct application of all methods of physical agents and the proper balance between activity and rest.

Reporting on the present activity in rehabilitation in England, Sir Robert Stanton Woods, member of the Committee on Rehabilitation of the Emergency Medical Service, makes an important observation in his plea for early treatment by physical medicine. "With the extension of modern rehabilitation facilities came the widespread realization that physical measures for restoring function—massage, electrical stimulation, remedial movement—must, to be effective, be applied early, in many cases from the beginning of treatment. The fracture case is no longer merely a broken bone to be joined together in good alignment, but a bone clothed in muscles, whose blood and nerve supply must be maintained throughout in the face of enforced immobilization, and in which healing must keep pace with the bony union. Massage, electrotherapy, assisted movement, afford very necessary and very effective means for maintaining the ebb and flow of blood and lymph in a muscle which must not or cannot be moved by the patient himself." Further, as regards the value of active movement, "As soon as the patient *can* move the injured part with safety, such purely local and passive measures of restoration may in the majority of cases be abandoned in favor of active therapy, since the muscle stimulus most potent for good is the one coming from the central nervous system. These nutrient fluids bathing the injured area must possess certain biochemical properties if optimum healing is to occur. The health and general muscle tone of the patient have to be considered, the scope of rehabilitation is widened still further to include dietetics and general exercise. We are no longer dealing with an injury, but with an injured body. Once the disabled person can be shown that he can throw a dart or kick a football, or hammer a nail, or work a loom almost as well as the next patient and better than he, himself, did yesterday, he is on the road to recovery, mental and physical. Now we are no longer dealing with an injured body, but with an injured person, body, mind and spirit."

Total war calls for total rehabilitation in all spheres, insofar as this is humanly possible of accomplishment. The concept of physical medicine, its basic procedures and scope have not been essentially altered since the earlier war, when the component parts of physical medicine were welded together for their greatest use in our first vast rehabilitation program.

During the past twenty-five years, research and development have brought further refinements in equipment and greater knowledge of the scientific principles underlying this valuable group of therapeutic procedures. To the armamentaria of earlier days we have added the so-called short wave therapy, with its many advantageous uses, electrically induced fever, of great value in certain specific conditions, electrically induced shock, which simplifies and standardizes the administration of shock therapy in psychiatric cases, refrigeration anesthesia, for amputations on the battlefield, etc., the electrocardiograph and the electroencephalograph for diagnostic purposes, to mention a few. Studies made in our accredited scientific institutions have added much to this field, both constructively and in exact scientific evaluation. Advances have been made in the treatment of poliomyelitis by our leading orthopedic men through the use of underwater therapy, and other physical measures. Sister Kenny has made a considerable contribution through original physical therapeutic technic.

The work that lies before us in the days ahead will present many medical problems difficult of solution, but *total physical medicine,* properly directed and administered, will again wage the battle of rehabilitation on the home front.

SUMMARY

Physical medicine, embracing hydrotherapy, electrotherapy, mechanotherapy, active exercise, games and passive exercise played an important rôle in rehabilitation of the disabled following the last war, and total physical medicine will again be a vital factor on the home front. The importance of adequate, trained personnel is emphasized. The work of the first complete clinic at the Walter Reed General Hospital in Washington is described, as well as that of the research clinic. Work done by the Lovell General Hospital in Ayer, Mass., is typical of current practice of physical medicine in U. S. Army hospitals.

SUMARIO

La fisioterapéutica, incluyendo la hidroterapéutica, mecanoterapéutica, ejercicios activos, juegos y ejercicios pasivos, sirven utilizables resultados en la rehabilitación de los dañados de la Guerra Europea No. 1 y la medicina total física servirá neuvamente como factor indispensable en el frente-doméstico. La importancia de un tratamiento competente y adecuado es acentuado.

Se describe el trabajo de la primera clínica completa en el Hospital General de Walter Reed en Washington, así como también la Clínica de Investigación.

Los trabajos hechos en el Hospital General de Lovell en Ayer, Mass., es típico y ejemplar.

RÉSUMÉ

La physiothérapie, l'hydrothérapie, la mécanothérapie, les jeux, la gymnastique, l'exercise actif et passif jouent un rôle d'une haute importance dans la réhabilitation des blessés de la dernière guerre. La médecine physique totale de nouveau sera un facteur vital dans le traitement des mutilés de la guerre actuelle. Il importe que nous disposions d'un personnel suffisamment instruit et d'un entraînement adéquat. L'auteur décrit les procédés employés à la clinique Walter Reed General Hospital of Washington. Il nous reseigne aussi sur les recherches poursuivies à cette clinique. Le travail qui se fait au Lovell General Hospital à Ayer, Mass., mérite une profonde considération.

Выводы

Физическая терапия, включая гидротерапию, механотерапию, активныя упражнения, игры и пассивные упражнения,

играли важную роль в реабилитации инвалидов после прошлой войны, и теперь опять физическая медицина сделается фактором первостепенной важности на домашнем фронте. Автор подчеркивает важность компетентнаго тренированнаго персонала. Описана работа первой полной клиники при Валтер Рид Госпитал в Вашингтоне, а также работа в разных научно-исследовательых клиниках. Типичной является работа выполненная в Lovell General Hospital in Ayer, Mass.

GUILLAUME DUPUYTREN

(Continued from page 380)

weighed his defects, Dupuytren has come down as one of France's most illustrious surgeons. His contribution to surgical armamentaria included an enterotome, a double-bladed bistoury, a cataract needle, compressor and ligature carrier.

Dupuytren classified burns, described echinococcus cysts of the bone, senile gangrene, traumatic aneurysm and varicose aneurysms. He was the first French surgeon to ligate the larger arteries. He described fractures and gave his name to the contraction of the palmar fascia, known as *Dupuytren's contraction,* and to fracture of the lower end of the fibula. He devised an operation for resection of the lower jaw and an effective operation for ingrown toenails.

Dupuytren did little writing, but his lectures were published by de Boisment and Mark, his pupils, in the *Lecons Orales de Clinique Chirurgical Faites à l'Hôtel Dieu de Paris,* in four volumes, 1830 and 1834. The work was translated into several languages. His memoirs *On Injuries and Diseases of the Bones* were translated and reprinted by the Sydenham Society.

ACKNOWLEDGMENTS

(Continued from page 401)

La Reforma Médica (Lima) Año XXX, Nos. 422 and 423, Mar., 1944.

Revista Médica Peruana (Lima) Año XVI, Nos. 172 and 173, Apr. and May, 1943.

Puerto Rico

Boletín de la Asociación Médica (Santurce) Año XXXVI, Nos. 4 and 5, April and May, 1944.

Switzerland

Helvetica Medica Acta (Basel) April, 1944.

Union of Soviet Socialist Republics

Chirurgia (Moscow) Nos. 8-9, 1943.

Comptes Rendus (Doklady) de l'Académie des Sciences de l'URSS (Moscow), Vol. XXXIX, No. 7, 1943.

Sovetskaya Medicina (Moscow) No. 7-8, 1943.

United States of America

Boletín de la Oficina Sanitaria Panamericana (Washington, D. C.) Año 23, Nos. 2, 3 and 4, Feb., Mar. and Apr., 1944.

Información sobre Enfermedades Venéreas (Washington, D. C.) July and Oct., 1943.

Puerto Rico Journal of Public Health and Tropical Medicine (Columbia University Press, New York) Vol. 19, Nos. 3 and 4, 1944.

Uruguay

Anales de la Facultad de Medicina de Montevideo (Montevideo) Tomo XXVIII, Nos. 9, 10, 11 and 12, 1943.

Venezuela

Boletín del Laboratorio de la Clínica "Luis Razetti" (Caracas) Año V, No. 13, Mar., 1944.

Revista de la Sociedad Medico-Quirurgica del Zulia (Maracaibo) Año XVII, No. 12, Dec., 1943; Año XVIII, Nos. 1 and 2, Jan.-Feb., 1944.

Editorials

Taking Stock of Ourselves

The International College of Surgeons, from its inception, chose for itself a high and exacting rôle—to shun and discourage *"surgical isolationism,"* and to create, cultivate, and amalgamate a world-wide surgical democracy. These are the purposes, paramount in the minds of the founders of the College in those years just before the world dissolved in the chaos of war.

As events move headlong toward the day when, it appears, mankind is to have another momentary chance to bring order out of that chaos, it is well to remember those purposes. There is challenge in them. We propose to accept that challenge.

The trend of today's best thought is to regard the organization of a stable peace as much more complex than it seemed to thinkers of other generations than ours. An international political system will not of itself create a durable peace, we are reminded again and again. There must also be means and machinery devised and perfected whereby men may work together across national boundary lines to solve the economic and social and cultural and scientific problems which can never again be considered soluble except on a world-wide basis.

In this infinitely complex effort to bind a world into unity and harmony, the international brotherhoods of professional men should be prepared to lead *new protagonists of good will tomorrow.* It is a hopeful thing that there are many fine and well-established societies of surgeons. Our aims are to cultivate fellowship across national boundaries and to give, through our practices and policies, substance and reality to the proposition that the science of healing knows no limits of language or race or creed. In each international surgical society worthy of its name, that thought should be uppermost in the minds of its leaders and be translated in the future into deeds and not words.

For us, the International College of Surgeons, thought about the post-war years should focus with sharp clarity upon our own endeavors. Now is the time for honest evaluation of the record. Now is the time to resolve that our College shall acquit itself with honor in its chosen rôle of democratic and inclusive fellowship.

Tenets and codes of the International College of Surgeons are characterized by simplicity. Take, for example, those two familiar sentences from our Constitution and By-Laws: Article I, Section 5:

> "It (the College) is decidedly against Arbitrary Restriction of Merit and is free of prejudice. It will recognize *the Surgeon* and his accomplishments, and will not be influenced by his financial, political, or other irrelevant status."

Should not that principle be written into the credo of every self-respecting surgeon and every great organization of surgeons?

Of course it should!

Is it not an unwritten law, accepted by every man in our profession who is

worthy of his calling, that the sanctity and purity of our calling can be maintained *only* by the elimination of all selfish motives?

Of course it is!

There is much merit in the principle enunciated. We are principally concerned with the extent to which we strive, in our own fellowship, to make that principle a *living reality.*

Let it be clearly understood that the International College of Surgeons, like every other worth-while surgical association, is concerned with and committed to the development of a *"surgical élite."* The quoted Article of our Constitution and By-Laws becomes significant as we think of it as a key to the concept of *"éliteness"* which is basic in our organization.

There has been altogether too much loose talk about a *"surgical élite."* What then is it in the dictionary of our International College of Surgeons? What do we mean by this *"crème de la crème"* which rises, and should rise, to the top of professional honor and distinction? Is it composed of those self-appointed men who, by virtue of inherited, purchased and hymeneal opportunities have secured position, ribbons, distinctions and diplomas?

Richard Rumbold once remarked that he never could believe that Providence had sent a few men into the world ready booted and spurred *to ride,* and multitudes saddled and bridled *to be ridden.* The founders of the International College of Surgeons shared his skepticism and wrote it into the tenets of the young organization that the right to ride high in public acclaim is a right to be won through patience and devotion.

The *"surgical élite"* to whom it will always be the joy of our College to pay homage are those men who have devoted their lives to the cause of surgical progress because they wished to serve, in spite of obstacles, hardships and vicissitudes. They are the men who have brought natural skills to perfection through laborious work, who have held to the ideals of their profession with complete selflessness, who have been willing to reach out a hand to help those struggling toward the competence and sureness which they have gained.

Such an *"élite"* can never be a closed and self-protecting clique or coterie. To it, potentially belongs that young surgical pathologist about to give up the struggle because microscopes are so expensive; the surgeon baffled in his effort to bring his gifts to full fruition because the clinics and lectures and courses are held in distant, inaccessible halls of learning; the capable surgeon ostracized and cold-shouldered in his community because his race or creed or national origin makes him conspicuous and suspect.

For great surgeons already secure in their position among the *"élite,"* the test comes at this point. Are they ready, even eager, to help men like these break the shackles that hold them back? Or does fear of the potential rival, of the young newcomer who may outdistance his peers if given a straight road to run, make them tend to withhold their hands?

The test is not unique to the leaders of the International College of Surgeons, but, because of the great principles on which the College is founded, it is a particularly crucial test. And it is important now, as never before, to ask ourselves and ask our leaders how far the faith has been kept. Has the International College of Surgeons lived up to its commitments?

The record is a promising one for all to read. A cross-section of our organization discloses the fiber of our fellowship. Here are men closely twined in university activities, and here men shut off from contact with centers of learning. Here are young men just beginning professional life, and here older men pa-

tiently teaching the wisdom and experience gained in years of study and professional practice.

Around the "green tables" of the International Board of Trustees and the Councils of the Chapters of the College many painful and inspiring dramas have played themselves out during the past few years. Painful because of the immense difficulties, material and spiritual, which have confronted members of the College in these difficult years. Inspiring because their faith in the men who sit around those "green tables" has been so abundantly justified. Problems seemingly insoluble, obstacles seemingly insurmountable, have been discussed and worked upon until solutions have been glimpsed. The extent to which those *"élite"* assemblages have come to be regarded as the embodiment of a true surgical democracy is one of the amazing facts of the history of our College. It augurs great things for our rôle in the future.

During the destructive war years, civic, military, professional and other activities have suffered much. Neither hospitals nor colleges nor surgical organizations have escaped the maelstrom of fascist madness. Yet, even in the darkest hours, the constituents—individual and collective—of the International College of Surgeons have met and counseled on ways and means of helping those in need of professional—and even spiritual —guidance. We have learned, as Somerville learned, that adversity is a sage and useful agent, a severe instructor, *but the best.*

Had it not been for the peculiar turn of world events, for example, we should perhaps have postponed or missed the closeness of association with our Latin-American colleagues which has been a bright light on a dark day. To New York, Philadelphia, Toledo, Chicago, and many other cities have come young surgeons from Latin America to present their *"surgical passports"* and to learn from their elders, to observe, and to be inspired. The College has done less for these men than it would wish to do, but it has nevertheless done considerable.

Committees and special groups of the College are hard at work today to plan the rôle of the International College of Surgeons in the post-war period. We have no salaried officers and no great monetary surpluses. *Our greatest asset is the desire to live up to the tenets, canons, and ideals of our undertaking. There we are as rich as Croesus.*

We are rich, too, in faith. Faith, that the lamp of tolerance and unselfishness which the founders of the College kindled is a light greatly needed for the healing of the nations in the dark days ahead. We believe that light, shining into dark corners, can eradicate destructive germs of evil and destroy their power to poison the life, not only of our own great profession, but of humanity itself, so that the time-worn aphorism of *homo homini lupus* will become unknown.

MAX THOREK.

Changing Trends In Suture Material

KOCHER, later Halsted, taught and strongly stressed the use of silk as an ideal suture and ligature material. Both of these superb artists in surgery made a profound impression on the surgical world. With them suture material was something to be handled with exquisite artistry and exactness. The results attained have been convincing to this day. Both of these able men have had many followers.

Later, catgut came widely into use.

Here was a material that handled easily and rapidly; that in time, sometimes much too soon, underwent absorption. The surgeon using it was not troubled with either the early or late removal of sutures. By and large, a certain percentage of the catgut patients returned with incisional hernias. Some of these untoward results were ascribed to getting out of bed too soon, starting to work too early, etc. Later it was found that frequently the sutures underwent absorption in a phenomenally short time and before healing took place, that the tissues were, so to speak, sometimes allergic to catgut. A good many years ago Bohler, a surgeon of vast experience, observed that when catgut was used in wound closures it often brought about wound infection. Surgeons began to look about for other and better materials. Babcock began his use of stainless steel wire. Not so long ago an exhaustive, comparative study on sutures was undertaken by the research department of Temple University. The findings as related to tissue tolerance were about as follows: stainless steel wire, cotton thread, silk, nylon, plastigut, catgut. Wire is rather troublesome mechanically, especially to those unaccustomed to its use, and if placed immediately underneath the skin or mucous membrane, may in time work its way through. Silk handles easily. If used in the finer sizes and in interrupted form, it is a splendid suture material but may at times lead to sinus formation. Cotton thread handles nearly as well as silk and is excellent for use as general purpose suture material.

It has been observed that cotton thread sutures apparently cause little or no tissue reaction and may remain in the skin or mucous membrane for weeks at a time without causing any inflammatory reaction around the suture. In the closing of skin wounds a good many surgeons use skin clips and place interrupted fine cotton thread sutures in the intervals between the clips. The clips are usually removed inside of forty-eight hours. The sutures may remain for ten days or longer. This sort of arrangement seems to give satisfactory healing without irritation.

JOHN A. CANNADAY.

Prevention and Treatment of Experimental Renal Obstruction from Sulfadiazine

AN ATTEMPT to evaluate the therapeutic measures usually employed in the prevention and treatment of renal obstruction produced by sulfadiazine is reported by David Lehr* (Department of Pharmacology, New York Medical College, Flower and Fifth Avenue Hospitals).

The investigation was made under the standard conditions of the animal experiment, using closely bred albino rats. "Forcing of fluid" was accomplished by daily stomach-tube feedings of fixed amounts of water. Alkalization was produced by adding sodium bicarbonate to the water. For purposes of comparison, two sub-groups received solutions containing an acidifying instead of an alkalizing salt (sodium chloride and ammonium chloride). After standard conditions had been established, sodium sulfadiazine was injected repeatedly in

*Bulletin of the New York Academy of Medicine, July 1944, page 424.

amounts which were known to produce massive precipitation in the renal tubules, provided no therapy was employed. Throughout the experiment (three to nine weeks), volume, specific gravity, pH and drug concentration in the urine were recorded daily and frequent determination of the sulfadiazine level and nonprotein nitrogen content of the blood were also carried out. Postmortem examinations were performed on all the animals which succumbed during the experiment and also on all survivors, which were killed by exsanguination.

It was found that chronic sulfadiazine intoxication produces in rats the most significant pathologic-anatomic changes in the kidneys, in the aorta and other parts of the arterial tree and in the thyroid.

The striking success of alkalization in combination with the "forcing of fluid" was clearly borne out by the high rate of survival (no deaths occurred) and the almost complete absence of significant lesions in the alkali-treated animals. Neither the forcing of water alone nor the administration of acidifying salt solutions provided adequate protection. Without exception, animals of the groups which succumbed to the sulfadiazine intoxication revealed massive intratubular precipitation of sulfadiazine accompanied by severe tubular dilatation and degeneration of the kidneys. Apparently related to the renal damage was the aortic damage, which consisted of a necrosis of the media starting in the muscle fibers, followed by swelling and destruction of the elastic membranes and imbibition of the necrotic tissue with calcium salts. In advanced cases, the aorta assumed a bamboo-stick-like appearance due to the segmental arrangement of bulging calcified rings. True bony metaplasia developed in some cases of longer standing. The thyroid showed marked macroscopic increase in size and histologically presented a picture of seemingly high glandular activity as previously reported by MacKenzie and others.

The investigation proved that in the animal experiment intrarenal concrement formation from sulfadiazine and its serious consequences can be prevented by alkalization in conjunction with the "forcing of fluids."

In the treatment of renal obstruction, renal block was produced by intraperitoneal injection of a single fatal dose of sodium sulfadiazine. If left untreated, the animal invariably developed pronounced and long-lasting renal obstruction from the intratubular precipitate of sulfadiazine, and 80 per cent succumbed after two or three days. Treatment consisted in stomach feedings of fixed amounts of water or salt solutions (containing either $NaHCO_3$, NH_4Cl, a mixture of these two, or NaCl. The fluids were given twice daily beginning with the day of renal obstruction and continuing for at least one day or more.

The therapeutic success achieved with solutions of NaCl and of the mixture of $NaHCO_3$ and NH_4Cl was striking. These solutions made possible the complete recovery of all rats from an otherwise fatal sulfadiazine intoxication, whereas no benefits were derived from "forcing of fluid" alone. Serum pH values obtained from heart blood indicated the presence of a severe uncompensated acidosis in the ammonium chloride group, and the development of an uncompensated alkalosis in the bicarbonate-treated animals.

From these findings, the remarkable therapeutic effect of a mixture of ammonium chloride and sodium bicarbonate in exactly the same concentrations which, when administered separately, had only toxic effects, can now be explained. The combination of the acidifying and alkalizing salt in one solution

will prevent dangerous changes in the acid-base balance of the body, which are so readily elicited in the presence of renal obstruction, and will thus enable the increased crystalloid concentration to initiate a powerful and life-saving diuresis (salt diuresis). This latter contention would also explain the therapeutic effect of large doses of saline solution, despite the drawback of being a slightly acidifying agent.

A. L. WOLBARST.

The Russian Army Medical Personnel on the Battlefield

FIERCE battles against the hordes of fascism are being waged on the frontiers of the Soviet Union. Guns are thundering, tank and airplane motors are roaring, and machine guns are rattling on a front stretching from the Barents Sea to the shores of the Danube and the Black Sea.

Each day brings new reports of deeds of frontline heroism and valor on the part of Soviet airmen, artillerymen, tankmen, the infantry, the signal corps and seamen. And each day also brings news of the fine work that is being done by the medical personnel in rendering first aid, in evacuating the wounded, of the efficient service rendered by the network of hospitals which was swiftly set up.

Nowhere is the doctor valued so highly as at the front. In the complex organism of modern armies the ambulance service occupies an important place. Great army men have always paid heed, and rightly so, to the voice of the doctor. Take, for example, the Russian Field Marshal Suvorov, one of the greatest soldiers in history (who, incidentally, was in Berlin in 1760 with the Russian army which smashed the troops of Frederick 11). Suvorov attached great importance to medical service for his men; his orders regarding doctors and hospitals show his concern for the health of the Russian soldier.

It is the duty of the medical personnel of the Red Army to see to it that every man and commander is strong, healthy and buoyant, to guarantee rapid recovery of the wounded and to make sure that wounds leave no after-effects or complications.

Soviet army doctors have more than once displayed genuine heroism, skill and ability to work under adverse conditions. At Lake Hassan and at Khalkhin-Gol in the Far East, and in the snows of Finland they calmly fulfilled their duty without thought of self. Doctors, nurses and ambulance personnel shared with the troops the hardships of marches and attacks, frequently rendering aid to the wounded under a hail of bullets and shrapnel. More than a thousand of the medical personnel were decorated with orders or medals for their work during the war against the Finnish Whites.

I have myself witnessed the valorous deeds performed by Red Army men in the Finnish war. I saw the might of our army technic in action, and I saw the notoriously "impregnable" fortifications of the Mannerheim Line collapse before our crushing impact. And the ambulance service of the Red Army is on as high a level as its military technic. In the Finnish war, 83 per cent of the wounded were restored to service. This is an unprecedented figure. In the great patriotic war the peoples of the Soviet Union are now waging this percentage will be

higher yet. Death from wounds will be the exception. These are our aims and we shall achieve them.

With the collaboration of prominent scientists the regulations covering the Red Army ambulance service, its tactics and organization, have been revised during the past year. The present regulations take all the features of modern warfare into account: mobility, heavy fire, mechanization, etc. Frontline doctors now render skilled aid under the most diverse conditions. Moreover, the aid is strictly specialized. For example, scalp wounds are treated by neurosurgeons, jaw wounds by stomatologists,

Ever conscious of the war danger, Soviet scientists have been doing much fruitful work of late on field surgery in their laboratories and institutes. Here are a few instances:

The Leningrad professors P. Kupriyanov and N. Yelansky have systematized the records of surgical aid to the wounded during the Finnish campaign and have made a number of interesting deductions relating to blood transfusion, the prevention of anaerobic infections, the treatment of wounded at various stages of evacuation, etc.

Professor V. Shamov, who has studied a wealth of data on scalp and brain wounds, has recommended new methods of transporting the wounded men and has outlined methods of treatment.

Professor S. Girgolava has worked out a method of preventing and combating frostbite.

Professor V. Gorinevskaya, Moscow, and Profesor J. Janelidze, Leningrad, have made a thorough study of lung and pleural wounds.

The Institute of Neurosurgery, which I head, has worked out methods of fighting shock—that terrible scourge of war.

What is more important, however, is the fact that thousands of medical workers have benefited by the research conducted by leading scientists. One of the means of circulating this knowledge and experience was the Field Surgery Week held at the end of last year in many large cities of the country. Moreover, thousands of doctors and nurses have gone through special military training. Soviet medical workers have gone to the front fully prepared for their difficult and self-sacrificing work. Most of them, by the way, went as volunteers, and there is no end to the medical workers, both young and old, who are volunteering. Those who remain in the hospitals and clinics in the rear are studying hard, preparing themselves to be able at any moment to replace their colleagues in the front lines.

As the wars in Mongolia and Finland have shown, a great many wounded men were saved by blood transfusion timely carried out right on the spot at first-aid points and field hospitals. This has been made possible, thanks to patriots who donate their blood to save the men defending the country. As soon as the news of the enemy's perfidious attack became known, the blood transfusion institutes throughout the land were literally besieged by citizens offering to donate their blood. Women workers came *en masse* from the factories after work. Students, housewives, typists, actresses, mechanics, teachers—in short, men and women of all ages and professions—are offering their blood, which will be preserved and sent to the front.

In these days of supreme patriotic fervor, I am immensely happy to know that my place is with the Red warriors who are destined to annihilate the fascist abomination.

I have written to my son, who is serving in the Baltic Fleet, telling him that I am confident that the enemy will soon discover the firm hand and unerring aim of Vladimir Burdenko, second in command on a submarine.

"This is a serious time in the life of our country," I wrote him. "You and I are among the ranks of our country's defenders; you in the Red Navy and I in the Red Army, as its chief surgeon.

"We know our duty, the duty of patriots, loyal sons of the country. With indomitable courage be an example to your younger comrades. Inspire them with heroic enthusiasm and ardent love for our great land. We will show the world once again what our Army and Navy can do in this hour of trial and we will give a worthy rebuff to the invaders."

The proud, freedom-loving Soviet people will never be brought to its knees.

Great is our strength and withering our hatred for the enemy!

Nicolai N. Burdenko, F.I.C.S. (Hon.).

CHAPTER NEWS

MEXICO

PROF. DR. MARIANO VÁZQUEZ, F.I.C.S., Regent of the Mexican Chapter in Neurosurgery, was elected Vice-President of the Mexican Academy of Surgery for 1944-46. Prof. Dr. José Rábago, F.I.C.S., Regent of Gynecology and Obstetrics of the Mexican Chapter, was elected Head of the Board of Directors of the Mexican Academy of Surgery for 1944-46.

Prof. Dr. Abelardo Monges López, F.I.C.S., Regent of Gastroenterology of the Mexican Chapter, was named Surgeon-in-Chief of the National Mexican Railways.

Prof. Dr. Gustavo Argil, F.I.C.S., (H.C.) Director of the Faculty of Medicine of the National University of Mexico, in a recent session of the Executive Council, was unanimously elected to serve for two years more in his important office of Director. This reelection sprang without doubt from the brilliant career of Dr. Argil. The International College of Surgeons congratulates its distinguished Mexican colleague on this honor.

PERU

DR. FRANCISCO GRAÑA, vice-president of the International College of Surgeons, has recently been elected president of the National Academy of Medicine of Peru.

HAITI

THE HAITIAN CHAPTER of the International College of Surgeons is making itself felt as is manifested by the report of its recent meeting recorded in the *Bulletin du Service d'Hygiène et d'Assistance Publique*. Prof. Bourand expressed his gratitude to the President of Haiti through his personal representative at the function for having made possible the presence of the Haitian delegation at the Fourth International Assembly of the International College of Surgeons held in New York in June, 1943. The members returned from the Assembly inspired, enthusiastic and invested with the necessary authority for the creation of the Haitian Chapter of the International College of Surgeons. Dr. Bourand analyzed the purpose and profundity of the College: "La Science n'a pas de patrie." He stressed some of the ideals of the College and pointed out its international character, emphasizing that whoever bears its name will be well received wherever he goes. Dr. Bourand concluded his address by saying that since May, 1942, he and Dr. Elie Villard had learned of their admittance to the Fellowship of the College, and again extolled the President's kindness in making

it possible to sojourn to the International Assembly to receive the diplomas and insignias, which according to the International Constitution, must be received in person.

A scientific program consisting of the following papers concluded the meeting: "Ovarian Conservation in a Case of Hysterectomy in Young Women," by Dr. Martial Bourand; "Pyelo-Renal Infections and Nephrostomy in Haiti," by Dr. C. Valmé; "Technic of Intracapsular Extraction of Senile Cataract," by Elie Villard.

AMENDMENTS TO THE CONSTITUTION AND BY-LAWS OF THE UNITED STATES CHAPTER OF THE INTERNATIONAL COLLEGE OF SURGEONS

THE following amendments to the Constitution of the United States Chapter have been made and approved by the International Board of Trustees:

MEMBERSHIP

1. The membership of the National Chapter shall consist of eight different classes of members. Minimum age and percentage of surgery shall be required as follows:

	Minimum Age	Percentage of Surgery
1. Matriculate	28	40%
2. Associate	32	60%
3. Member	36	80%
4. Associate Fellow in Pathology, Anesthesiology, or Roentgenology	32	
5. Fellow	40	100%
6. Master		
7. Emeritus		
8. Patron		

It is further provided that Associates and Members are given a five year limit in which to submit for reconsideration their progress for advancement in rank to either Member or full Fellowship. Failure to meet this educational requirement may forfeit continued membership in the College.

ENTRANCE FEES

2. The present schedule of Entrance Fees is as follows:

FELLOW	$100.00
ASSOCIATE FELLOW	$100.00
MEMBER	$100.00
ASSOCIATE	$ 75.00
MATRICULATE	$ 50.00

ALL FEES ARE TO ACCOMPANY THE APPLICATION.

Matriculates are to forward $25.00 with the application, and the remaining $25.00 upon being advised of having qualified.

Should any application not meet required qualifications, the fee will be promptly refunded.

ADDITIONAL FEE FOR PROMOTION

Matriculate to Associate	$25.00
Associate to Member	$25.00
Member to Fellow	NONE

ANNUAL DUES

Matriculate and Associate	$15.00
Member and Fellow	$25.00

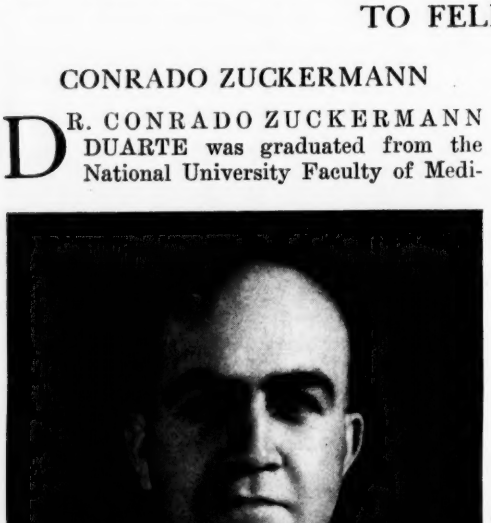
MEMBERSHIP.—For information about membership in the International College of Surgeons and other matters pertaining threto, address *Mr. Ralph E. Osborne, Business Secretary, The Drake, 1512 Spruce Street, Philadelphia, Pa.*

NOTICE. In order to insure prompt delivery of the JOURNAL, those who contemplate changing or have changed their address, or those entering or leaving military service, please notify promptly Mr. Ralph Osborne, Business Manager, 1512 Spruce St., Philadelphia 2, Pa., of their new address.

PEN PICTURES OF SOME SURGEONS RECENTLY ADMITTED TO FELLOWSHIP

CONRADO ZUCKERMANN

DR. CONRADO ZUCKERMANN DUARTE was graduated from the National University Faculty of Medi-



Conrado Zuckermann.

cine, having been awarded a gold medal for his scholastic attainments. His thesis on the "Metabolism of Carbohydrates" did much to publicize in Mexico the discovery of insulin by Banting and Best.

Immediately following his graduation Dr. Zuckermann was appointed clinical assistant of the Faculty and Consulting Surgeon of the General Hospital. Named clinician in cancer at the Institute of Hygiene, two years later he published a book on cancer which achieved wide recognition.

A professorship in surgical pathology at the Faculty of Medicine followed. His "Surgical Pathology," the result of seven years of work, was the crowning achievement of this period of his career. However, his specialty is surgery, and the "Surgical Studies," published in 1938, introduced in Mexico the results of his neurosurgical studies. His work on "Present State of Surgery in Cerebral Tumors," was favorably commented on at the Second International Assembly of the International College of Surgeons.

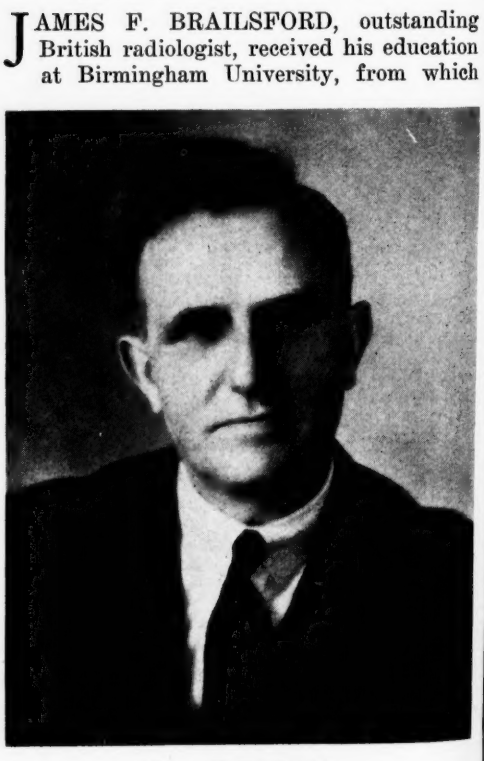
The outcome of Zuckermann's many scientific excursions in the United States and other foreign countries is an entertaining volume "Travels of a Surgeon."

In 1940 Zuckermann became chief of the Anti-Cancer League. He founded and is director of the excellent new publication "Revista Mexicana de Cirugía, Ginecología y Cancer."

Zuckermann published "Surgery of Constipation" in 1939; in 1940 appeared "Studies in Cancer"; at present his "White Uniform" is on the press. Besides he is the author of numerous contributions in the fields of surgery to surgical literature, malignancies and surgical gynecology.

JAMES F. BRAILSFORD

JAMES F. BRAILSFORD, outstanding British radiologist, received his education at Birmingham University, from which



James F. Brailsford.

he obtained his M.D. in 1928 and his Ph.D. in 1936. A member of both the Royal College of Physicians and the Royal College of Surgeons, Brailsford was awarded the Robert Jones Gold Medal and Prize of the British Orthopedic Association in 1927 and the Roentgen Prize of the British Institute of Radiology in 1935. He has twice held the chair of Hunterian Professor at the Royal College of Surgeons (1934-35, 1943-44).

Dr. Brailsford holds the following appointments: Radiological Demonstrator in Living Anatomy, University of Birmingham; Honorary Radiologist at the Royal Cripples (Orthopedic) Hospital, the Queen Elizabeth Hospital and the Warwickshire Orthopedic Hospital; Consulting Radiologist to all municipal hospitals of Birmingham; the Robert Jones and Agnes Hunt Orthopedic Hospital; the Birmingham Mental Hospitals; the Birmingham Accident Hospital and Rehabilitation Center.

Affiliations with medical societies include: the British Orthopedic Association; the Royal Society of Medicine; the British Medical Association; the British Institute of Radiology; and the Birmingham and Midland Medical Society. In addition to contributions to various periodicals, Dr. Brailsford is the author of "The Radiology of Bones and Joints," Third Edition.

BASIL HUGHES

BASIL HUGHES was born at Cheshire, England, the second son of the Vicar of Cheswardine. He was educated at Park House School, Reading, Eastman's Royal Naval Academy and Selwyn College, Cambridge. His medical education was obtained at King's College Hospital, London, where he was Senior House-Surgeon and House-Physician in 1909 and 1910. He completed his medical training in London, Vienna and Berlin.

Dr. Hughes was Casualty Officer at the Royal Free Hospital, London, and House-Surgeon of the Paddington Children's Hospital in 1911. From 1911-13 he was Resident Surgical Officer of the Royal Infirmary, Bradford. During World War I he saw service in all posts of the medical branch and was awarded the D.S.O. and decorated with the Order of St. Sava of Serbia.

At present this distinguished British surgeon is Honorary Surgeon, Bradford Royal Infirmary; Honorary Consulting Surgeon, Bradford Children's Hospital; Senior Surgeon, Bradford Municipal General Hospital. A Fellow-Founder of the Association of Surgeons of Great Britain and Ireland and of the Surgical Union Club of Great Britain and Ireland, Dr. Hughes is also a member of the Bradford and Leeds Medico-Chirurgical Societies.

Basil Hughes.

Contributing to medical journals, shooting, farming and country pursuits take up Dr. Hughes's leisure time. He is the author of "War Surgery, from Firing Line to Base."

ROBERT J. McNEILL LOVE

ROBERT LOVE was born in Plymouth, Devon on May 2, 1891. He was educated at Taunton School and the London Hospital. In 1914 he was qualified as a doctor and the following year was commissioned in the Royal Army Medical Corps,

serving at Gallipoli, in India and Mesopotamia.

On his return, Love was connected with the London Hospital. He became Surgeon to the Royal Northern, Metropolitan, St. Peter's, Whitechapel and Milday Mission Hospitals and Consulting Surgeon to the Epsom and Ewell and City of London Maternity Hospitals. In 1929 he was made Hunterian Professor of the Royal College of Surgeons.

Affiliations include: Fellow Royal Society of Medicine and Medico-Legal Society; Examiner in Surgery, General Nursing Council.

His publications cover the field of general surgery: *A Shorter Surgery; A Short Practice of Surgery* and *A Short Practice of Surgery for Nurses* (both in collaboration). His contributions to periodicals have been numerous. Some of the treatises on surgery bearing his name as well as that of Hamilton Bailey have been received with acclaim in their homeland as well as in the United States of America and elsewhere.

Robert J. McNeill Love.

IN MEMORIAM

LLOYD THOMAS SUSSEX, M.D., F.A.C.S., F.I.C.S.

Dr. Lloyd Thomas Sussex, Fellow of the International College of Surgeons, died of coronary thrombosis on June 8 at Farragut, Idaho. Dr. Sussex was born in Hope, North Dakota. He obtained his B.S. from the University of North Dakota and his M.D. from Northwestern University Medical School (1926). His internship was spent at Wesley Memorial Hospital, Chicago. From 1927-30 he did postgraduate work at the Mayo Clinic, Rochester, Minnesota. Dr. Sussex was on the staff of Kennedy Deaconess and Sacred Heart Hospitals from 1930-1942. He was attached to the latter hospital as lecturer in surgical diseases in the Nurses' Training School. In 1942 he entered the Naval Medical Corps. In September of that year he was assigned to active duty in the Pacific, where he served eighteen months. Dr. Sussex was a member of the American Medical Association, the Montana State Medical Association, the Hill county Medical Society, the Alumni Association of the Mayo Foundation, as well as a Fellow of the American College of Surgeons and the International College of Surgeons. We extend our deepest sympathy to the family of our beloved colleague and esteemed friend.

BOOK REVIEWS

The Treatment of Peptic Ulcer. George J. Heuer, C. Holman and W. A. Cooper. 118 pp. $3. J. B. Lippincott Co., Philadelphia, 1944.

The unique value of the book by Heuer and his associates lies in the meticulous records kept by the authors in which they have noted conditions in 98.2 per cent of 1139 medical and surgical ulcer cases, followed up over a period of ten years by repeated return of the patients to the clinic. This in itself is a tremendous task. The data from the examinations were grouped as follows: results of medical management; results following the different ordinary operative procedures such as: gastroenterostomy, excision of ulcer and gastroenterostomy, gastric resection; frequency of postoperative marginal ulcers; frequency of malignant transformations *in ulcus;* management of massive bleeding ulcers; influence on gastric acidity by gastroenterostomy and gastric resection. The exceptionally fine presentation of the material well compensates for the disadvantage that the total number of surgical cases were relatively few as compared with other operative statistics. To elucidate: This reviewer notes from the statistical tables embodied in the work that the total number of gastroenterostomies performed was 201, resections 142 and radical operation of marginal ulcer only 9.

The principal results may be summarized as follows: 732 patients were treated medically (hospital stay one to six months; Sippy diet). Results: 55 per cent labeled as satisfactory; 35 per cent unsatisfactory; 10 per cent could not be evaluated because of the short followup period. The 35 per cent of failures listed represent those requiring operative procedures, though only 10 per cent were since subjected to operation. The remaining 25 per cent were tabulated as unsatisfactory and not yet subjected to operation. This permits the conclusion that in these latter instances operation seems indicated.

The author's conclusion concerning the medical treatment is as follows: "If study of this series has revealed anything, it is that we should urge surgery more strongly than we have, particularly in those patients in whom hemorrhage is a prominent feature of this disease and in those with a rapid progressive course in whom pain and tenderness in the epigastrium suggests the possibility of perforation."

In evaluating the results of operative interventions, it is noteworthy that Heuer is inclined to favor gastroenterostomy. In a short or long-term basis of followup of gastroenterostomy the good results were only 10 per cent lower than in those with gastric resection (73 per cent: 83 per cent satisfactory results), representing no appreciable difference from that observed in the operation for duodenal or gastric ulcer. Heuer had observed only 11.9 per cent of marginal ulcers following gastroenterostomy and 1.4 per cent following resection.

In connection with the discussion of marginal ulcers following gastric resection, the author cites the work of Mage, in which over 8 per cent recurrent ulcerations, in 502 patients, were subjected to resection. The reviewer wishes to point out that the diagnosis in a considerable number of cases cited by Mage may not be entirely free from criticism.

The total mortality (immediate and late) is comparatively high (77 per cent), but the total mortality in all patients subjected primarily to gastroenterostomy is also high (6.4 per cent).

It would be regrettable to draw definite conclusions if the relatively good results of gastroenterostomy presented in Dr. Heuer's book vary from Heuer's own conclusions. Heuer leaves little doubt that when general and local conditions permit or hemorrhages occur or there is evidence of malignant degeneration, resection is indicated. It seems to this reviewer that technical difficulties due to local pathologic conditions should also receive emphasis, for it is here that exclusion resection procedures find their greatest value. In cases in which resection of a duodenal ulcer is beset with increased dangers to the patient's life, one must, in the opinion of this reviewer, give preference to gastroenterostomy.

One is clearly impressed with Heuer's scholastic work, which is based on experience. His recommendation of subtotal resection is timely indeed. The author believes that removal of half of the stomach seems to suffice and that it is of utmost importance to embrace in the resected segment the antrum and pylorus of the stomach. His more conservative stand with regard to the extent of gastric resection is influenced by his studies of pre- and postoperative gastric acidities. Subtotal gastric resection of whatever magnitude does not insure an achlorhydria or anacidity; an anacidity may fail to insure a satisfactory result. The satisfactory results following resection may continue for years in the presence of a normal or high acid secretion. Indeed, the studies of Heuer show that, regardless of the extent of resection, as long as the removal includes the antrum, pylorus and ulcer-bearing duodenum and regardless of the postoperative acidity findings, the satisfactory results approach within 5 per cent those who, after resection, have a postoperative anacidity.

Space forbids further evaluation of this fine work. The investigations of Heuer and his associates give sound fundamental directions to ulcer treatment, both medical and surgical. The work is of indubitable value to both internist and surgeon; its use is further augmented by the fact that as a result of the war there will be noted an increased incidence of ulcer-frequency in all lands.

Surgery of Modern Warfare. Edited by Hamilton Bailey. Part VI, pp. 897-1108, 146 illus. E. S. Livingstone, Edinburgh, 1944. *(For review of Parts I and II, see the Mar.-Apr., 1944 issue; for review of Parts III and IV, see the May-June issue; for review of Part V, see the July-Aug. issue.)*

Part VI, the last volume to appear of this excellent series on War Surgery continues the section on Wounds of the Trunk, and treats of surgical diseases encountered in subtropical countries, concluding with a section on Administration. Several interesting case histories make the chapter on Wounds of the Large Intestine particularly graphic. Special attention is given to chemotherapy applied to wounds of the rectum and buttocks. The excellent illustrations add much to the chapters on abdominal, renal, bladder, urethra and testicular wounds. One of the unique subjects presented is subtropical surgery. Much has been written on tropical diseases, but subtropical surgery is practically a virgin field. Under Administration such topics as The Stretcher Case, Wounds in Naval Action, Transportation of Wounded, Hospital Organization in the Emergency Medical Service, and

Organization of a First-Aid Post are discussed. A valuable appendix contains additional up-to-date information on chemotherapy, shock-hemorrhage syndrome and its management, blood transfusion, frostbite and burns, anesthesia, vascular surgery, amputations, technic of bronchoscopy, abdominal wounds, the changing character of wounds, etc. An adequate index makes this set of volumes on War Surgery not only handy and compact but easy to use. This reviewer unreservedly recommends the set to students and practitioners in all branches of medicine and particularly to surgeons.

Principles and Practices of Inhalational Therapy. Alvan L. Barach, M. D., Associate Professor of Clinical Medicine, Columbia College of Physicians and Surgeons. 315 pp., 50 illus. $4. J. B. Lippincott Co., Philadelphia, 1944.

Inhalational therapy is important for all physicians and surgeons who have patients to care for. The diseases amenable to treatment by means of gases, positive pressure and vaporized solutions of certain drugs are many and varied, and a review of this important subject, which includes the technics as well as the physiologic basis, should be of interest to every member of the medical profession.

The new book by Dr. Barach presents a preliminary chapter on the historical and physiologic background of inhalation therapy which is followed by thirty-one chapters on diseases for which methods of inhalation therapy are indicated. The last five chapters deal with equipment and technic.

The chapters on diseases follow a uniform pattern consisting of four sections: definition, pathologic physiology, inhalation therapy and bibliography. No attempt is made to include in the description of diseases the etiology, symptomatology or treatment other than inhalation therapy. Many of these chapters are only one or two pages in length, but those on altitude sickness, pneumonia, congestive heart failure, bronchial asthma, pulmonary emphysema and chronic pulmonary tuberculosis are quite lengthy and comprehensive.

The last part of the book deals with various masks, tents, respirators and other forms of apparatus and equipment with illustrations and photographs supplied by the manufacturers.

The book undoubtedly will prove to be valuable to all physicians and surgeons who wish to understand the physiologic basis as well as the technics of inhalation therapy.

China's Health Problems. Szeming Sze, General Secretary, Chinese Medical Association and Editor, Chinese Medical Journal. Ed. 2. 60 pp. $1. China Institute in America, Washington, D. C., 1943.

The strong demand for a second edition of this interesting monograph, first prefaced by the author in May, 1942, was responsible for the appearance of this volume in April, 1943. The merit and success of the work lies in the comprehensiveness of its information on health problems and medical organization in China. The deep interest and sympathy which exists today in America toward problems of aid and relief for China, especially medical relief, are manifest and widespread.

The author, from the very outset, draws attention to a possible source of confusion arising from the support of mission hospitals and training of medical personnel, hence in this book he has attempted to put the main problems in their perspective and to reach out for the "long-term problems" and the "semi-permanent ones," transcending the immediate vicissitudes of the present war.

Mr. Sze is in possession of factual knowledge and dependable information in every detail, and he has grouped and classified the various subjects in sequence of basic importance and historic evolution:

1. Scope of China's Health Problems.
2. State Medicine.
3. Nongovernmental Hospitals and Private Practitioners.
4. Health Education.
5. Medical Education.
6. Medical Societies.
7. Army Medical Service.
8. Civilian Medical Relief.
9. Assistance from Abroad.
10. Medical Supplies.

Thus, we see in this complete presentation not only the main and urgent problems, but a categorical consideration of the inherent inter-relation to be reckoned with in the solution of what the author calls "long-term problems," while giving due attention to the introduction of modern demands in the exigencies of the present war and looking ahead in preparation for post-war necessities, rehabilitation, preventive medicine and standardization.

In this little volume Sze has met the issues from every angle of the problem known and soundly prepares for the possibilities and probabilities in the unfolding of things to come and things to do.

The author has cleverly adapted his monograph to library purposes as well as dissemination of timely information.

Surgery of Pancreatic Tumors. Alexander Brunschwig, Professor of Surgery, University of Chicago. 425 pp., 123 illus., 1 col. pl. C. V. Mosby Co., St. Louis, 1944.

The monograph by Brunschwig on the *Surgery of Pancreatic Tumors* is most comprehensive. The historical data are informative and enlightening. The evolution of the various operations performed at the present time confirms the thought and deductions of those who were pioneers in this type of surgery. There seems to have been nothing omitted in considering the symptoms, diagnosis and treatment of the several conditions causing jaundice. Exception may be taken to the statement that pain is nearly always present in carcinoma of the head of the pancreas, since the great majority have no pain at all. It must be admitted that every distended gall bladder is not caused by malignancy of the papilla of Vater or the pancreas.

The illustrations are excellent, the type easily read. The bibliography covers a wide field pertaining to this particular subject. It behooves every surgeon to read this book, a classic in its particular field.

War Endocrinology. James H. Hutton. 363 pp. The Wayside Press, Chicago, 1943.

War Endocrinology supplies an excellent guide to the common endocrine problems encountered by the physician in private practice who lacks time or facilities to familiarize himself with the voluminous literature on endocrinology and who sees endocrinopathies as only one of his daily problems.

The facts of clinical importance are presented to him by the author in such a way that he can grasp these facts in the brief time his daily works allows for reading. The author's rich experiences in the field of endocrinology are based on facts gleaned from physiologic and histologic studies and experimental data. Tests and diagnostic procedures are thoroughly explained. Commercial endocrine preparations are evaluated in treating various endocrinopathies. The material is comprehensive, embracing the pituitary, thyroid, adrenals, gastro-intestinal tract, female and male endocrinology, essential hypertension and diabetes, the parathyroids, thymus and pineal glands, obesity and methods of study, and finally endocrine preparations.

The format is convenient and the book well printed.

Cataract and Anomalies of the Lens. John G. Bellows, Assistant Professor of Ophthalmology, Northwestern University Medical School. 624 pp., 208 illus., 4 col. pl., and numerous tables. $12. C. V. Mosby Co., St. Louis, 1944.

This exhaustive compilation and presentation of cataract from the clinical standpoint is the result of a lifetime of research and experiment by Dr. Bellows. The material is not new, having been presented in such works as Duke-Elder's *Ophthalmology*. The book covers a wide range of information, beginning with embryology and chemistry and closing with an excellent chapter on senile cataract, including its operative and nonoperative treatment and complications which arise in removing the lens. A careful study is made of the structure and composition of the crystalline lens. The lens, as well as other tissues of the body, undergoes a continuous metabolic process of nutrient absorption and waste removal. When this metabolism gets out of balance, opacities, failing vision and other optical disorders follow. The chemistry of protein substances in the lens is treated at length in the belief that a better understanding of its processes might lessen the incidence of spontaneous cataract. Various developmental defects of the crystalline lens, cataracts due to ultraviolet radiation and to trauma, and cataracts resulting from endocrine dysfunction are discussed at length. Removal of the lens is one of the most delicate of surgical procedures and upon the skill with which it is done rests the future of the individual involved. Numerous illustrations and charts recommend this well-presented volume to the ophthalmologist and general surgeon.

Enjoyment of Art in America. Regina Schoolman and Charles E. Slatkin. Introduction by George Harold Edgell. 792 pp., 740 illus. J. B. Lippincott, Philadelphia, 1942.

The subtitle "A Survey of the Permanent Collections of Painting, Sculpture, Ceramics and Decorative Arts in American and Canadian Museums, Being an Introduction to the Masterpieces of Art from Prehistoric to Modern Times" explains the wide range of subject matter covered by the book, virtually the entire field of art, and makes it possible to readily locate where choice art objects are to be found without loss of time or trouble.

Profusely and excellently illustrated, many of the plates will be of great interest to the surgeon-artist, not only for their beauty but for their anatomical content. The rôle which anatomy plays in art can be traced as the ages pass before us. In some of those we can see how, when anatomy was neglected, the level of art fell, and then as anatomy became a serious study, art revived and became a living entity.

The book is clearly written and contains comprehensive notes and an index. To the busy medical man who is interested in art, this book supplies a long-felt want.

Completely conceals all skin discolorations—

COVERMARK

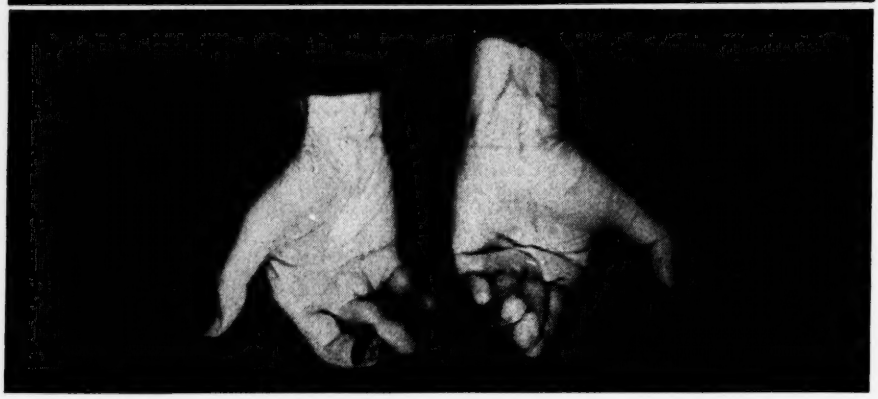
for post-operative scars, birthmarks, vitiligo, etc.

LYDIA O'LEARY, INC., 551 FIFTH AVENUE, NEW YORK 19 • Chicago [2] 30 N. Michigan Ave

In cases of rehabilitation surgery, Covermark is indicated in post-operative use to provide restored parts with normal coloring of surrounding skin, thereby improving the appearance and mental outlook of patient.

Application without charge at Lydia O'Leary offices in New York and Chicago. Please give patient your card.

LIPPINCOTT SELECTED PROFESSIONAL BOOKS



"Will I ever use these again?"

What assurance can you give this despairing patient? Today, hand injuries lead the list of industrial accidents. War, too, is crippling strong, young hands in appalling numbers.

America's doctors—general practitioner and specialist, alike—must be ready to meet this real challenge with precise, up-to-the-minute knowledge and skill.

Dr. Sterling Bunnell's outstanding, new book, *Surgery of the Hand*, gives every doctor confronted by hand injuries the last word in the specialized field of reconstructive hand surgery.

Dr. Bunnell's knowledge is helping America's doctors to say with assurance, "*You will use your hands again!*"

SURGERY OF THE HAND

STERLING BUNNELL, M.D.

STERLING BUNNELL, M.D., is one of the men in all the world best qualified to write on the diagnosis and treatment of hand injuries. He is internationally known and recognized. His professional societies include: Honorary Member of the American Academy of Orthopedic Surgeons; Member of the American Association of Surgery of Trauma, American Society of Plastic and Reconstructive Surgery, Licentiate of the American Board of General Surgery and American Board of Plastic Surgery.

WHAT MUST THE HAND SURGEON KNOW?

Surgical reconstruction of the hand involves a composite knowledge of orthopedic, plastic and neurologic surgery. Highest success requires competency in all three fields. *Surgery of the Hand* has been written specifically to give a thorough working knowledge of these three specialties.

DESTINED FOR GREATNESS

750 PAGES • 600 ILLUSTRATIONS • $10.00

A LIPPINCOTT SELECTED PROFESSIONAL BOOK

SURGERY OF THE HAND *is one of the many Lippincott books thousands of general practitioners and specialists find invaluable in maintaining basic and advanced skills. Lippincott Selected Professional Books afford authoritative references in the fields of medicine, surgery, dentistry, nursing and pharmacy. We shall be glad to send you the list of our books.*

A LIPPINCOTT SELECTED PROFESSIONAL BOOK — DROIT ET AVANT

J. B. LIPPINCOTT COMPANY, Philadelphia 5, Pa. JICS-1044

Enter my order and send me Bunnell's *Surgery of the Hand*, $10.00. ☐ Charge my account ☐ Cash enclosed

SEND TO: NAME _____

STREET ADDRESS _____

CITY AND STATE _____

Under your guarantee, I may return the book in 10 days, otherwise I will pay in full within 30 days.

LIPPINCOTT SELECTED PROFESSIONAL BOOKS